

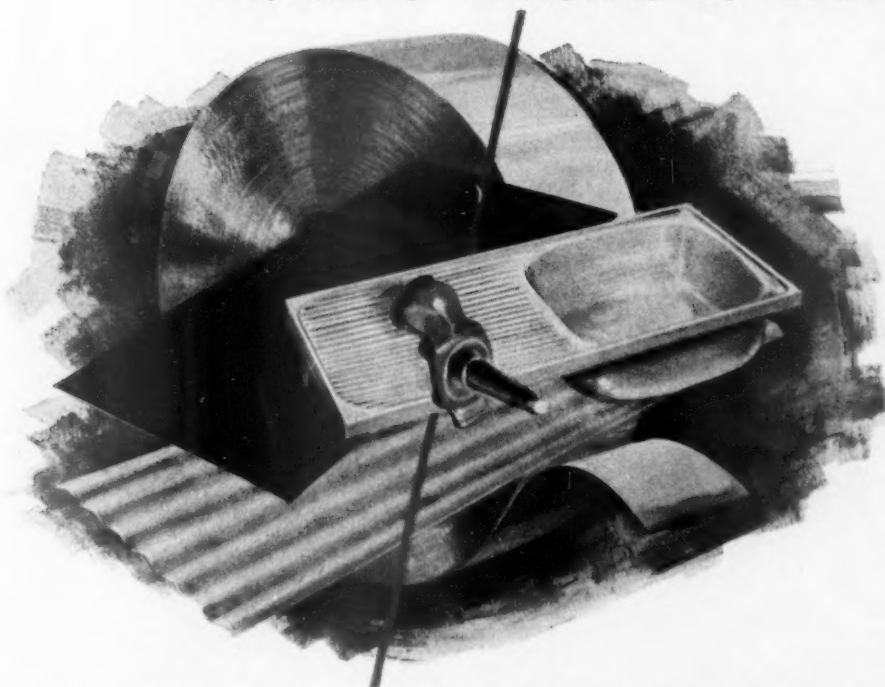
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First in Europe to install a continuous wide-strip mill, RTB make steel that serves you in many ways.

For without RTB modern methods and strip-mills, many amenities, nowadays taken for granted, might have been unknown at a reasonable price: your stainless steel sink, your motor body, those thousands of household articles.

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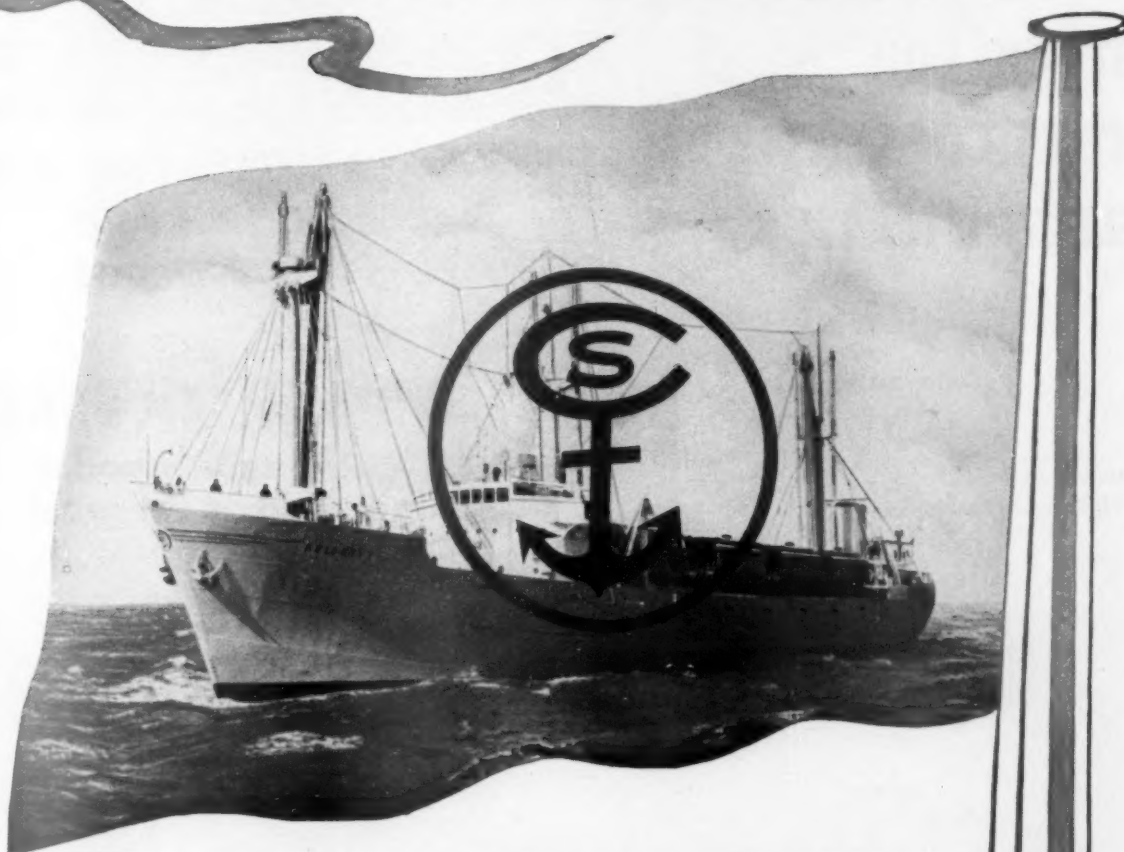


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KENT COAST
ELECTRIFICATION**

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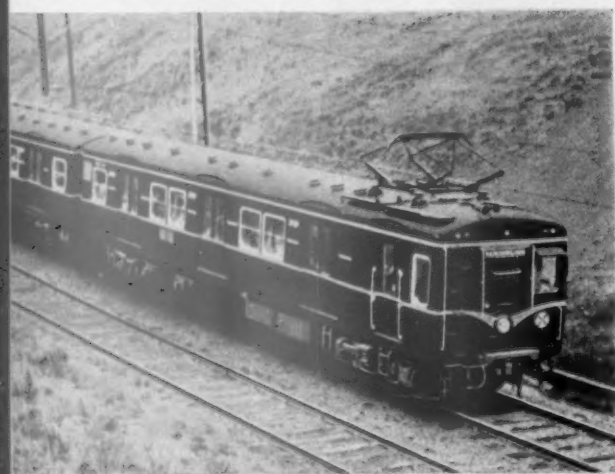
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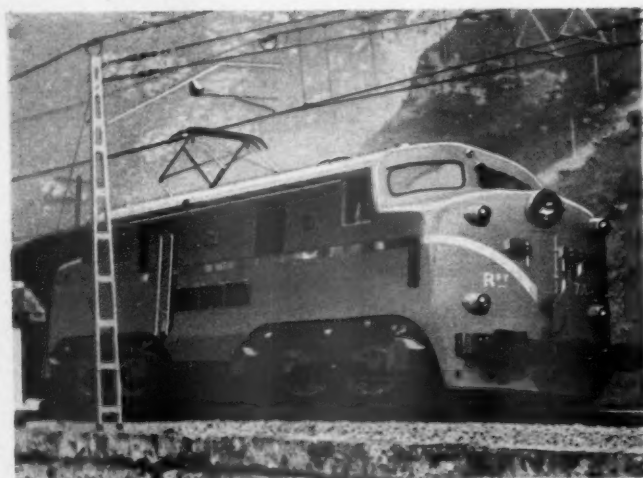
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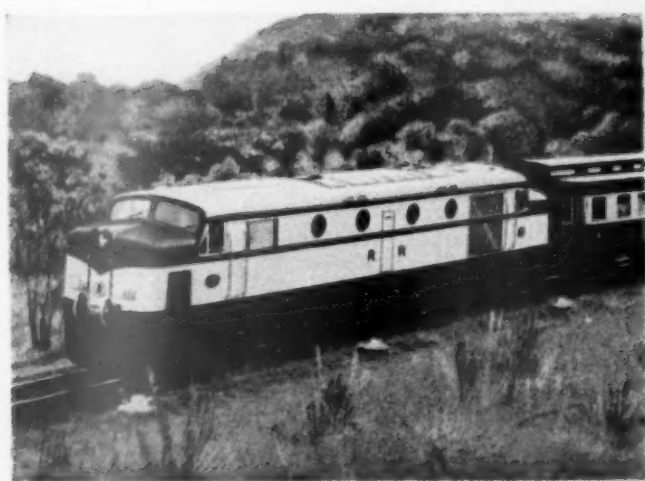
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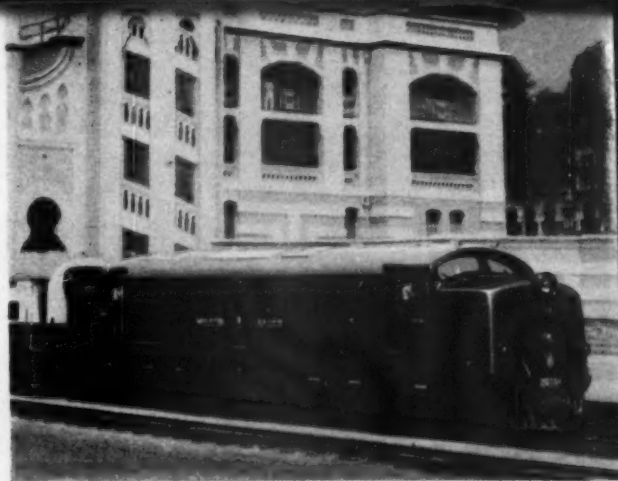
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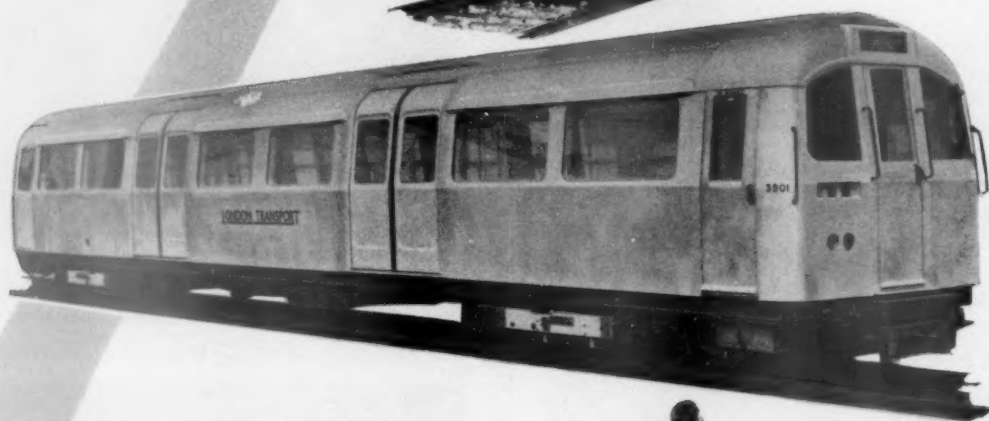
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PEL supplied the seating.*

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In Pel's view, only the closest examination of the very bones of a seating problem can yield a correct and logical design.

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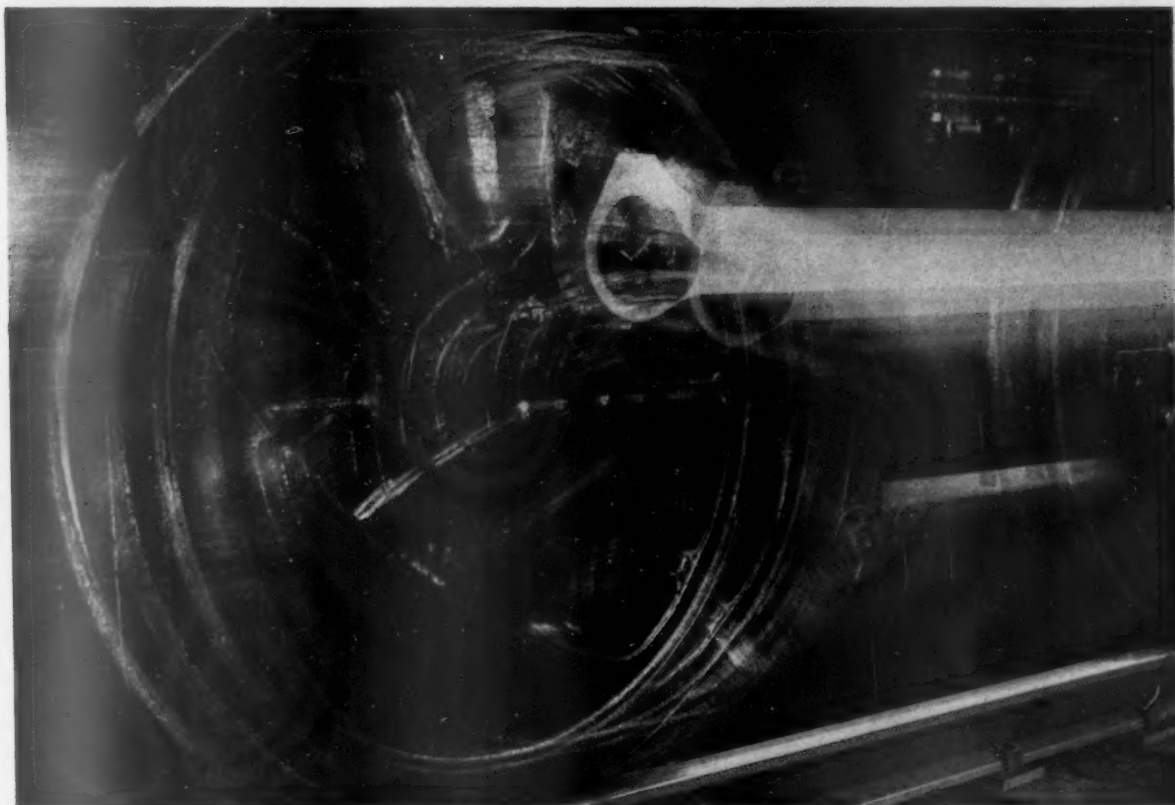


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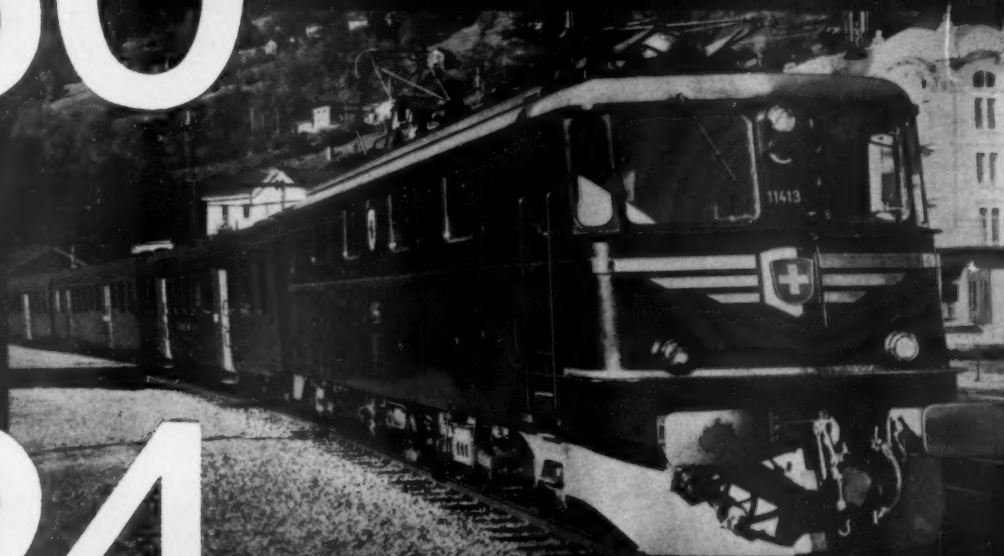


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90 years experience
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of locomotives and railcars!

50

of these 6000 HP Co-Co type locomotives are giving excellent service on the Gothard and the Simplon lines of the Swiss Federal Railways.



24

To meet traction requirements due to increasing traffic 24 more of these powerful and reliable engines have been ordered lately.

35

A further contract for the supply of 35 Diesel-electric locomotives, 600 HP each, fitted with SLM traction Diesel engines has also been placed by the Swiss Federal Railways.



Swiss
Locomotive and Machine Works
Winterthur

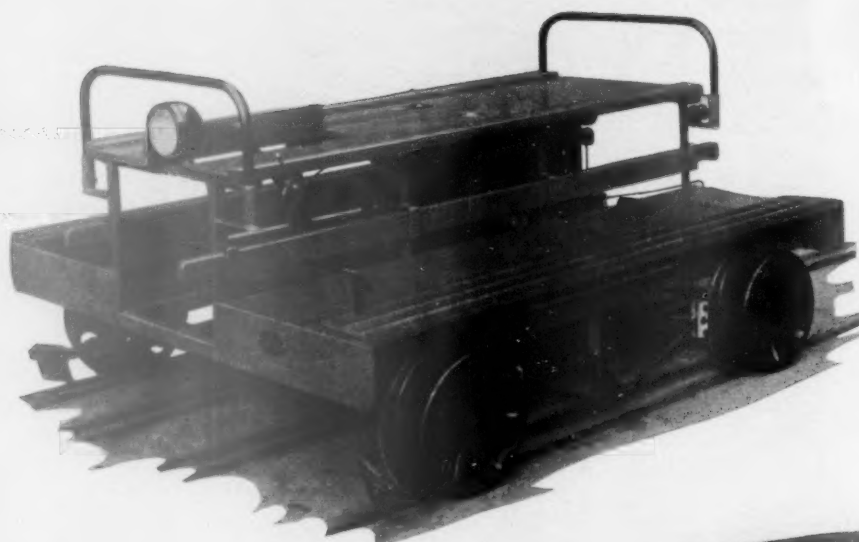
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Only the Wickham No. 4 gives you:—

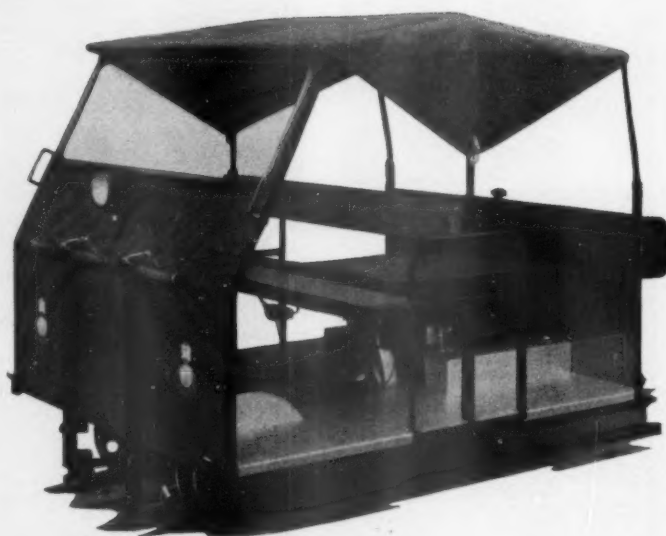
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★ **TWO SPEED FORWARD AND REVERSE GEAR BOX**



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Fitted with an 8 b.h.p. blower-cooled engine and totally enclosed transmission, it is available in two main versions, as illustrated. Each accommodates six men. Pull-out handles are fitted for derailing.



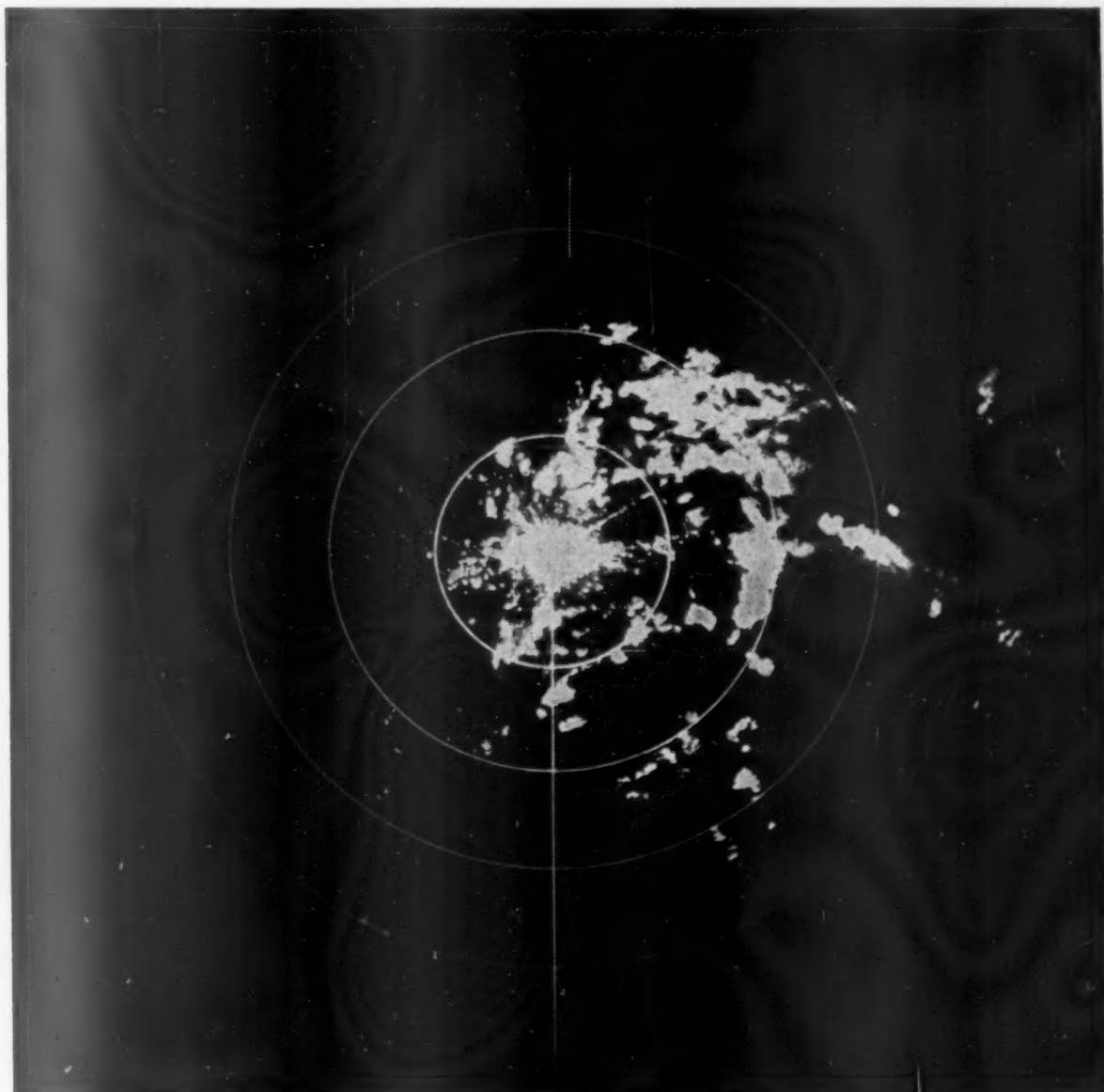
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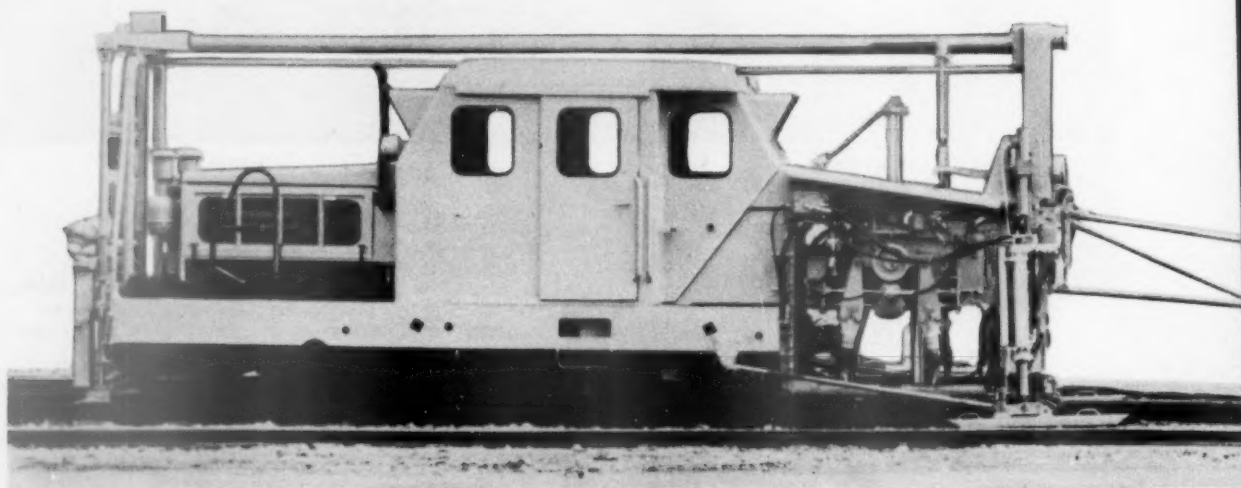
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B.60 LEVEL-TAMPER

PERFECT LEVELLING
BY ONE MAN
AT NORMAL RATE OF TAMPING

PRECISION	<i>± 1 mm. in both longitudinal and transverse profiles</i>
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ECONOMY	<i>One man replaces the normal levelling and jacking gang</i>

65 Matisa B.60 Level-Tampers sold in less than a year



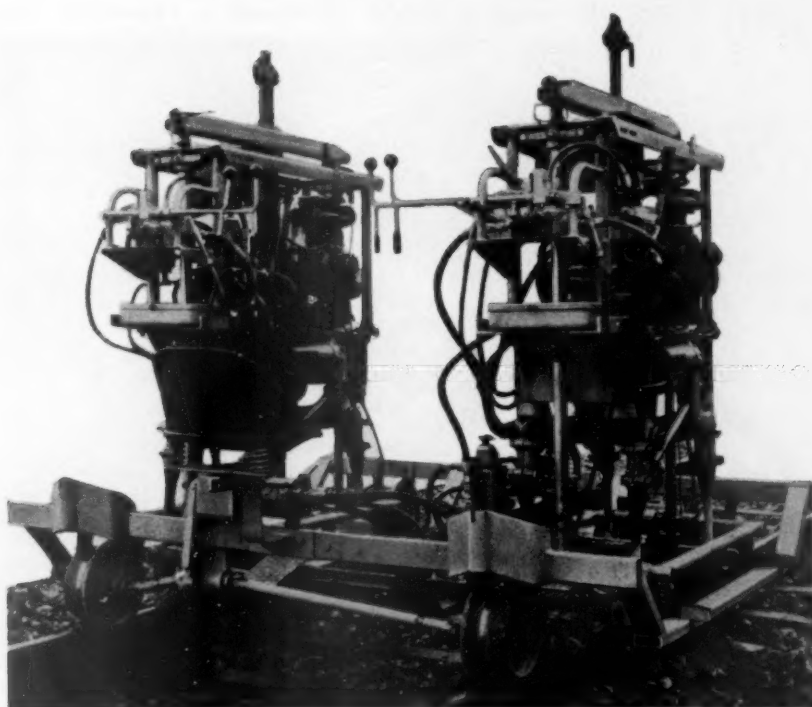
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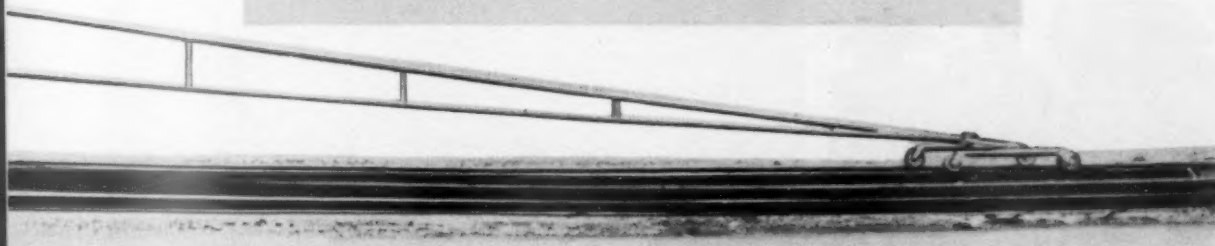
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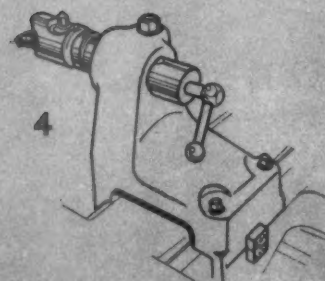
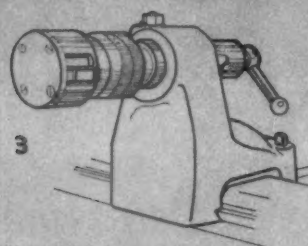
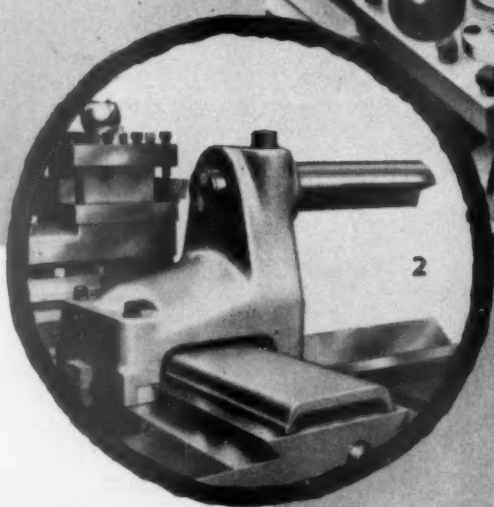
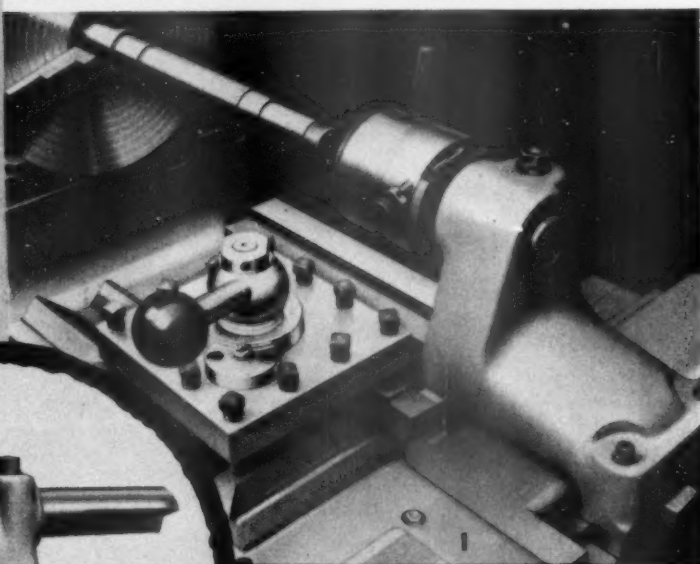
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is supplied as standard equipment on all D.S.G. centre Lathes except when D.S.G. copying units are built in enabling various operations such as Drilling and Boring to be carried out from the saddle position using normal longitudinal power feeds.

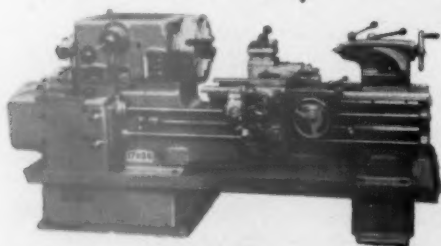
OPERATOR FATIGUE IS REDUCED — PRODUCTION INCREASED

The power drilling attachment can be used for mounting drills, boring bars, reamers or dieheads and operations can be carried out using either hand traverse or power feed giving distinct advantages over the use of the Tailstock. Improved pitch accuracy is obtained when using the diehead with full leadscrew control.

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Type 17 inch centre lathe



1. Diehead
2. Core Drill
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Locomotives in great variety, ranging from 300 to 2300 h.p., are built by Werkspoor.

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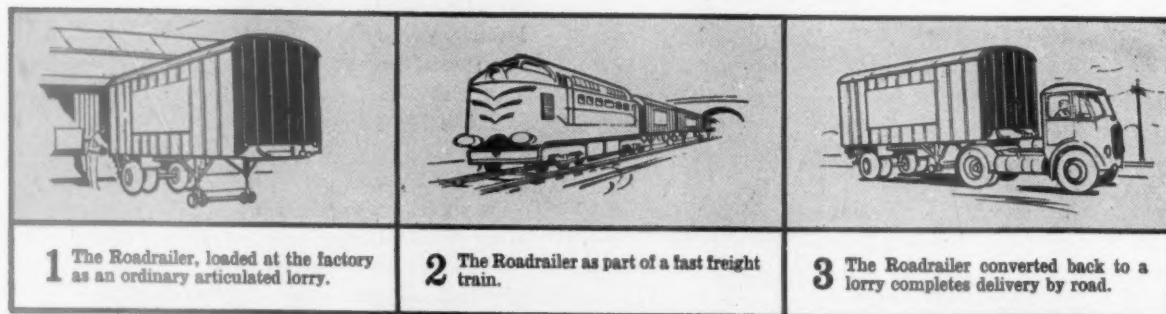
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WORKS AT UTRECHT (HOLLAND)





*This lorry... could be up there
if only it were a Roadrailer!*



What have roads got that railways haven't? Door-to-door service on the same vehicle. They also have something else—traffic jams! These can make a potentially fast service into a frustratingly slow one.

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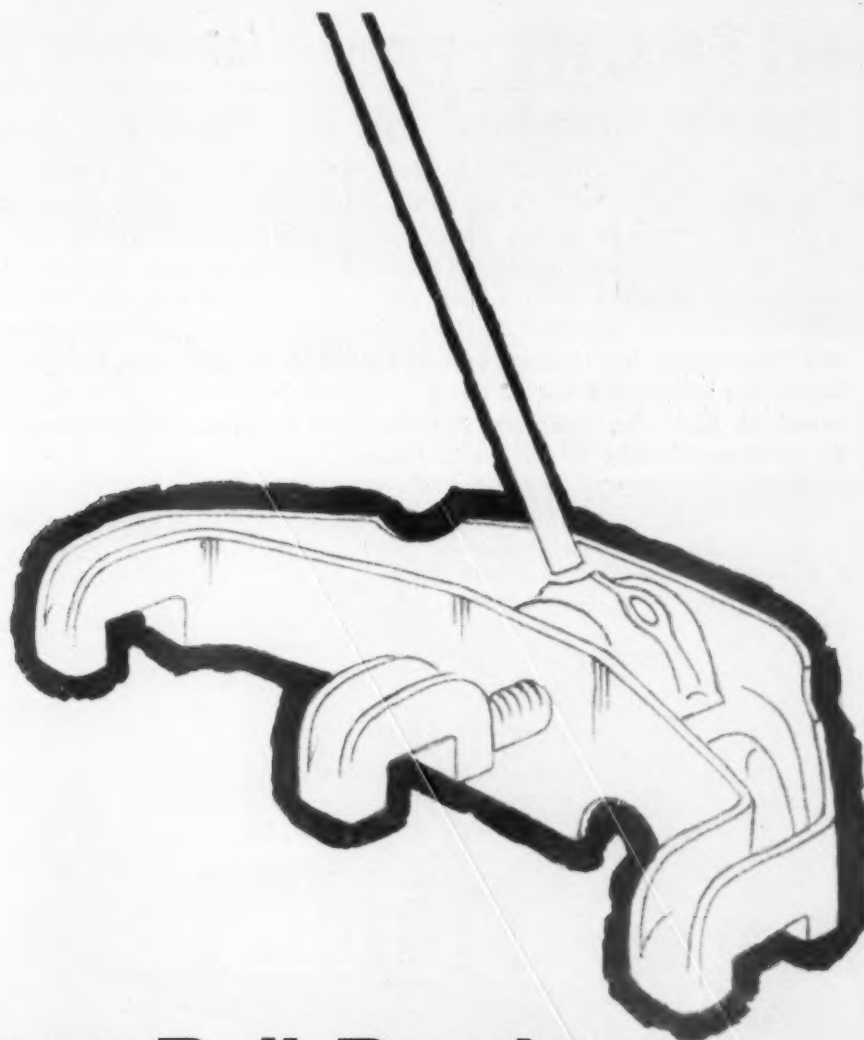


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*Railway Division,
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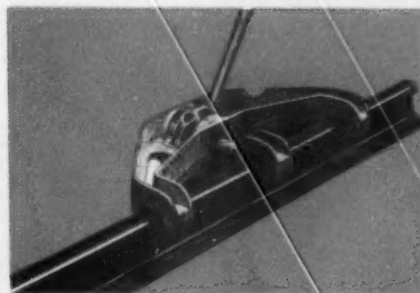
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Girder Section for stiffness
Roller Bearings to reduce effort
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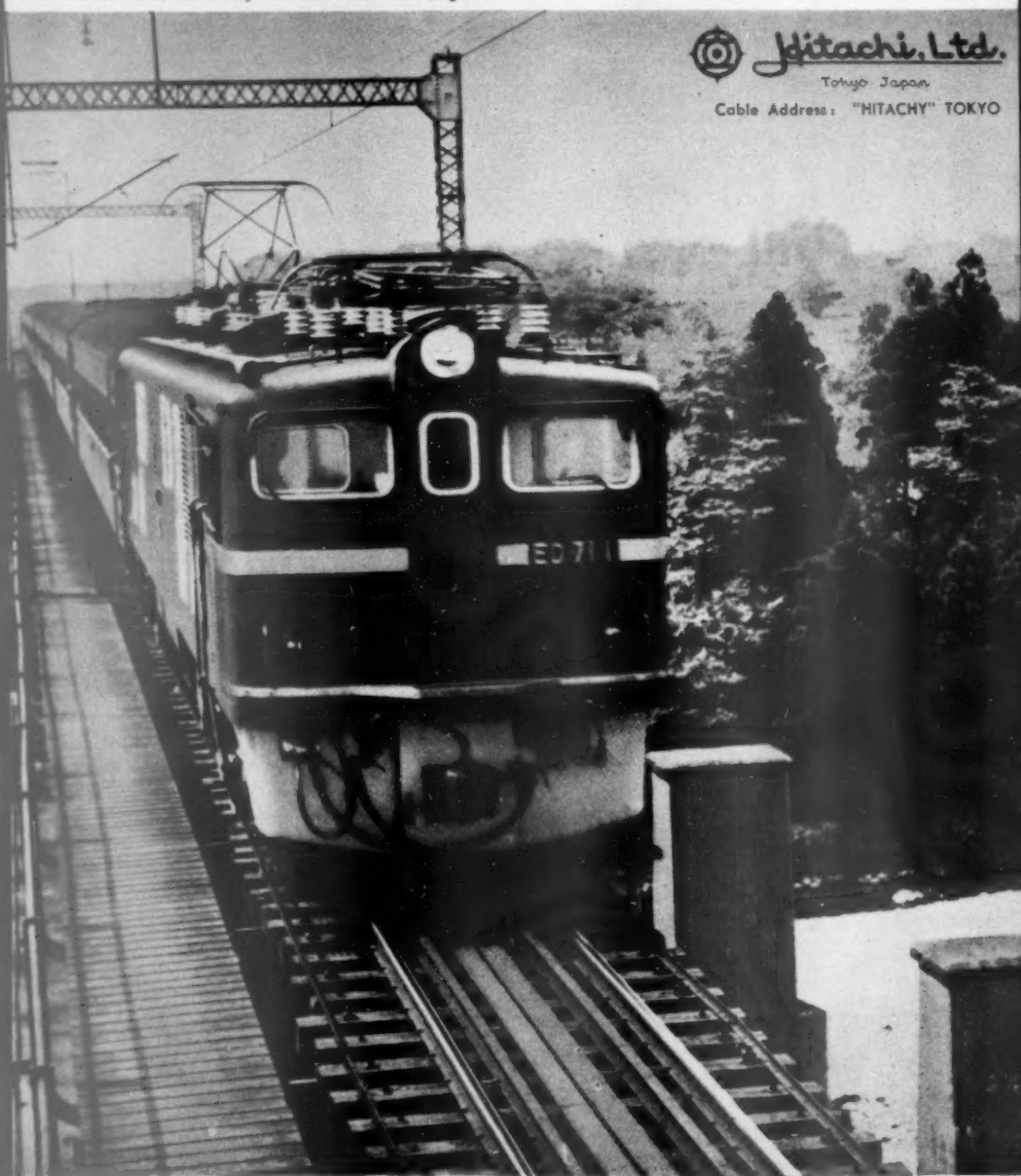
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HITACHI proudly introduces **ED 71**

Japan's standard A. C. electric locomotive

The development of the ED 71—Japan National Railways' standard A.C. electric locomotive—has been yet another Hitachi success story. Three prototypes were trial-manufactured in 1958, one being equipped with the Hitachi excitron type mercury arc rectifier, transformer and high-tension tap changer. After extensive performance tests by JNR, all 29 ED 71 locomotives built the following year were mounted with the Hitachi "Excitron" mercury rectifier, while the Hitachi transformer and high-tension tap changer system were also incorporated. The ED 71 is a 64-ton, four-motor locomotive with a rated output of 1,900 kW and a maximum operating speed of 95 km/hr, enabling it to be used for either passenger or freight service. 42 units are already in service in Japan.



Hitachi, Ltd.

Tokyo, Japan

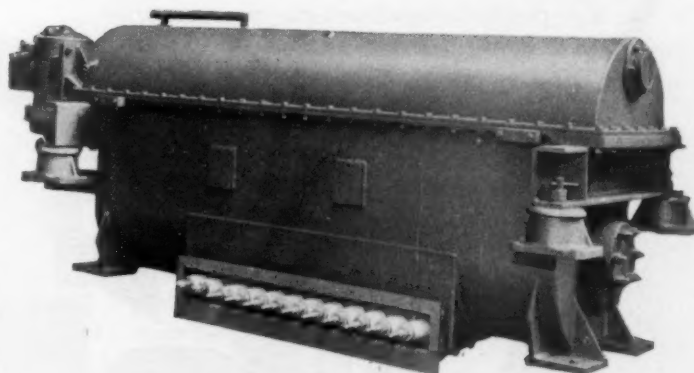
Cable Address: "HITACHY" TOKYO



SILENTBLOC mountings in new B.R. electric stock

The multi-unit motor coach illustrated is one of a group of 71 such units built at York and Doncaster with electrical equipment by the General Electric Company Ltd.

The G.E.C. 1,000 kVA transformer and two reactors (as shown here) are carried on Silentbloc anti-vibration mountings. These motor coaches provide the power for 3 or 4 coach multiple-unit trains on the Eastern Region Suburban lines.



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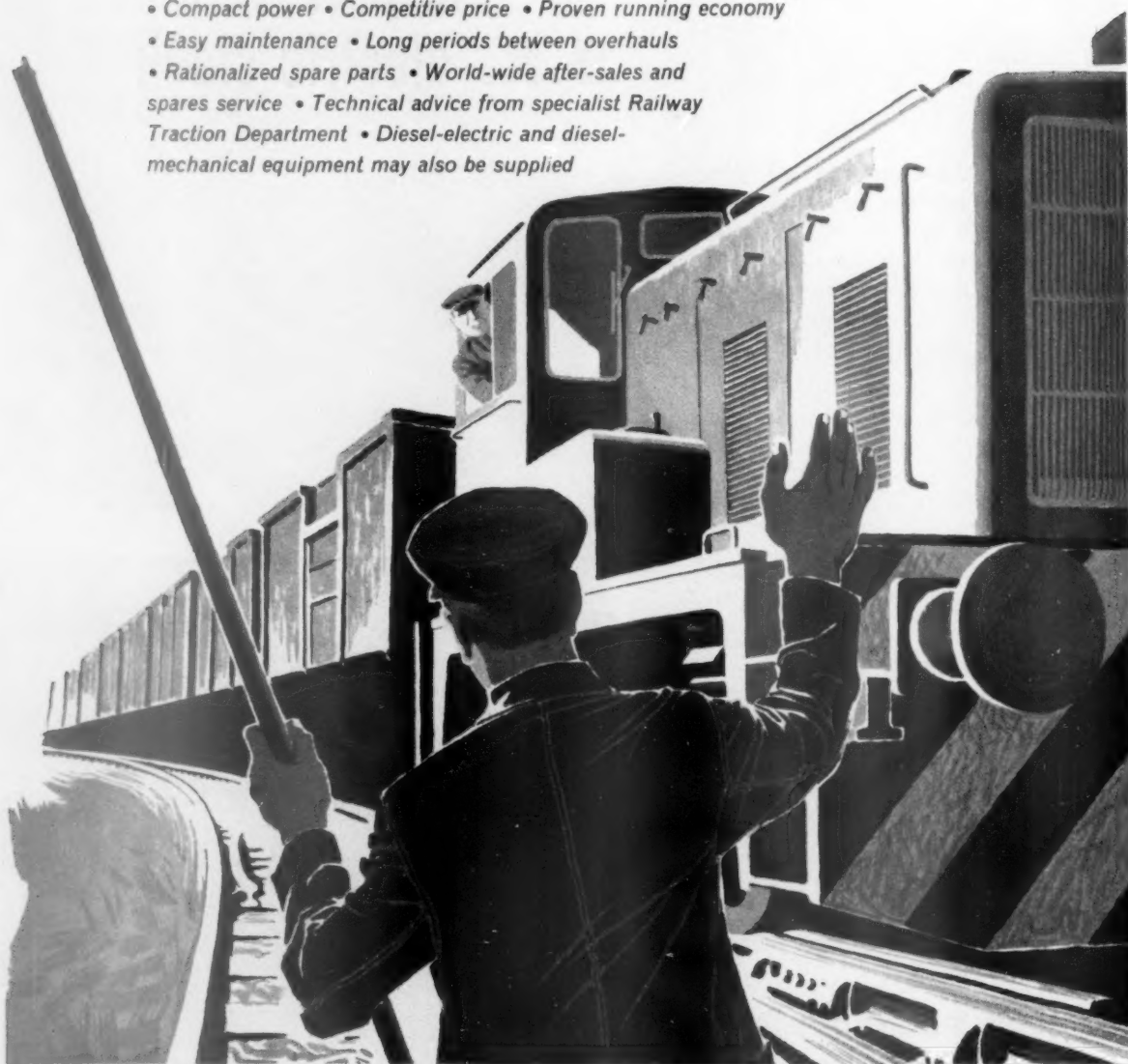
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FOR SHUNTING, FREIGHT AND MIXED TRAFFIC LOCOMOTIVES

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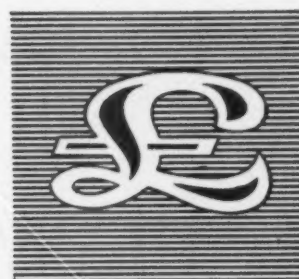
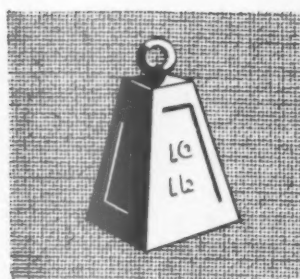


Builders of locomotives and railcars, and operators who are considering redesigning and re-engining existing equipment, are invited to write to:

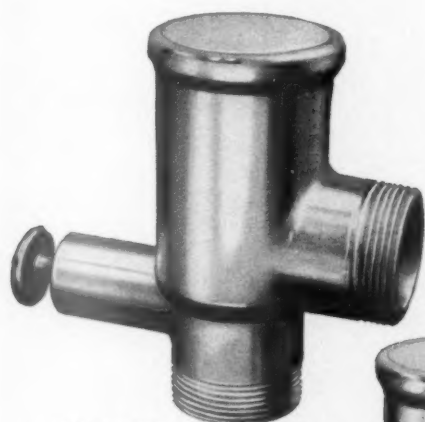
ROLLS-ROYCE LIMITED · RAILWAY TRACTION DEPARTMENT · SHREWSBURY (Tel: 52262) ENGLAND

ROLLS-ROYCE—AERO ENGINES · MOTOR CARS · DIESEL AND PETROL ENGINES · ROCKET MOTORS · NUCLEAR PROPULSION

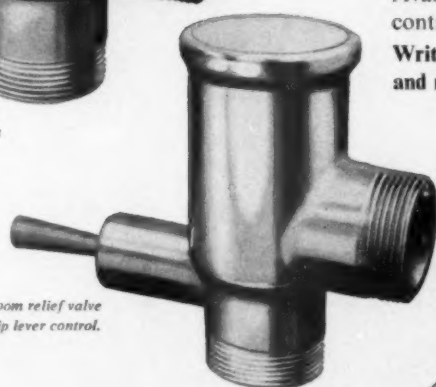
SAVE



weight · water · space · cost!



Mushroom relief valve with push button control.



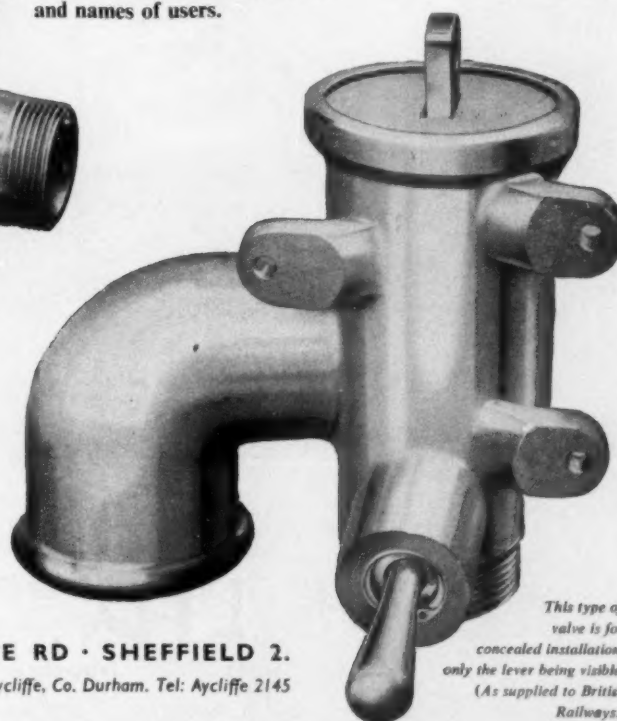
Mushroom relief valve with trip lever control.

Neat, light and space-saving, Wild Lavatory Flushing Valves operate at maximum efficiency with the minimum use of water. The prescribed amount of water for flushing—it can vary from $\frac{1}{4}$ to 2 gallons—is strictly regulated and the valves will function satisfactorily down to a 3 ft. head of water.

The trouble-free operation of these valves is determined by basically simple design, ensuring positive re-seating and instantaneous action. This same simplicity eliminates the need for small bye-passes so there is no risk of clogging.

Available with trip lever or push button control as illustrated.

Write for explanatory literature and names of users.



This type of valve is for concealed installation, only the lever being visible. (As supplied to British Railways.)

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by

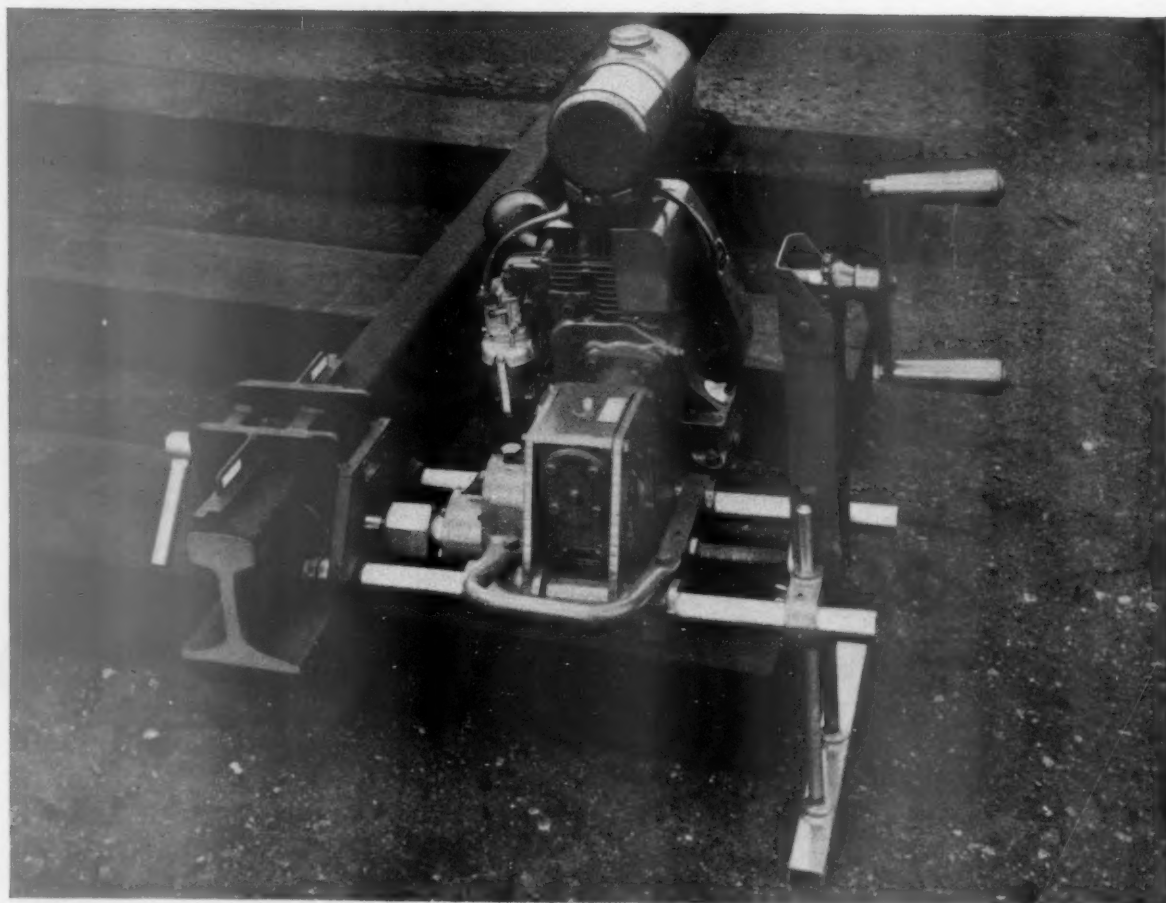


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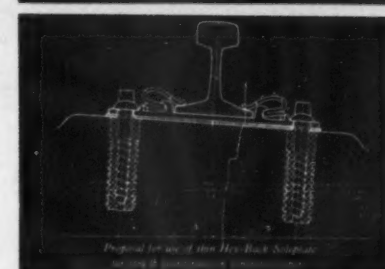
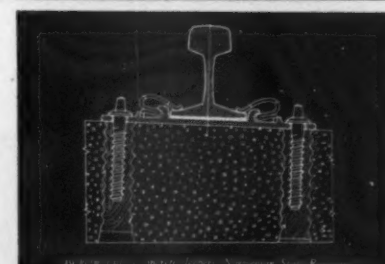
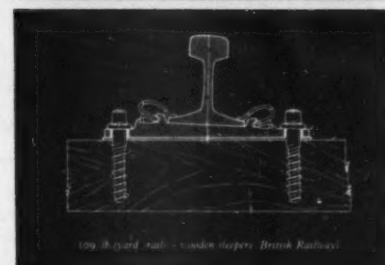
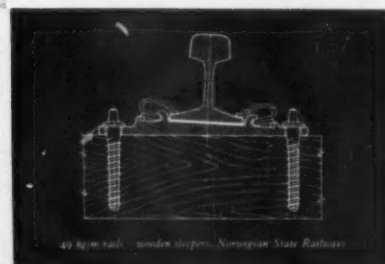
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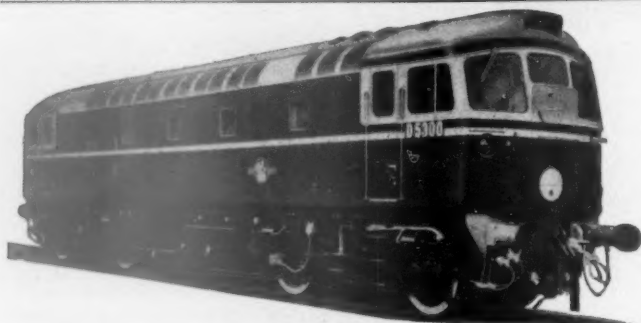
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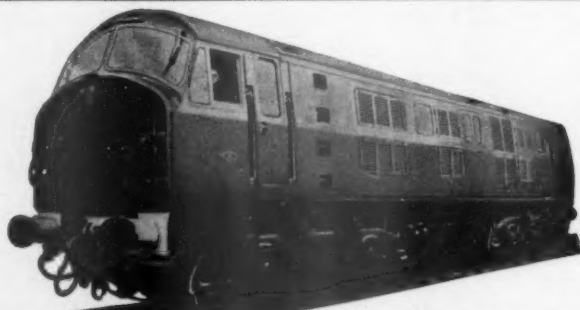
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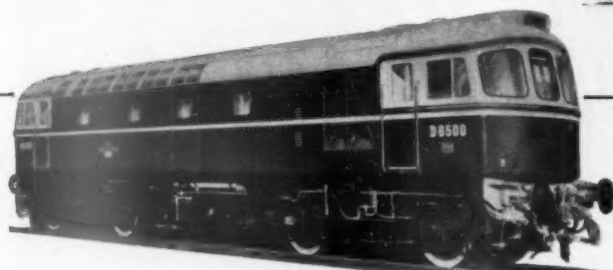
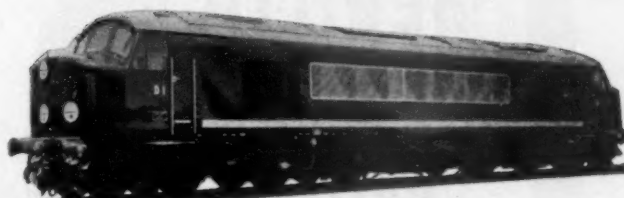
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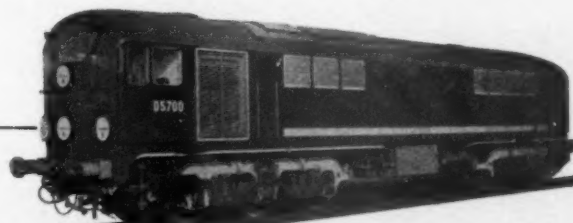
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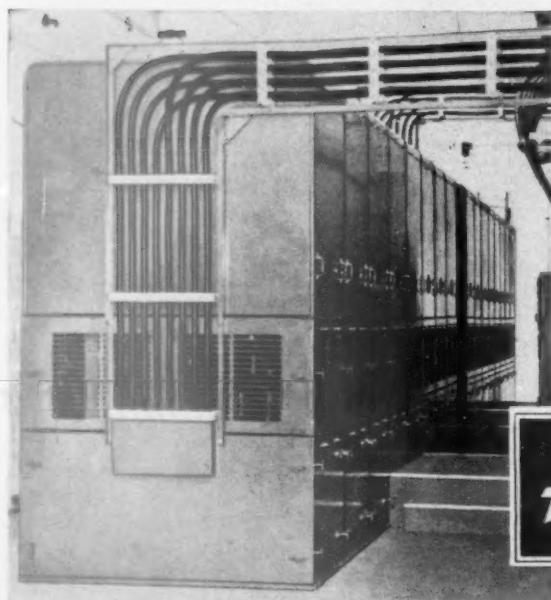
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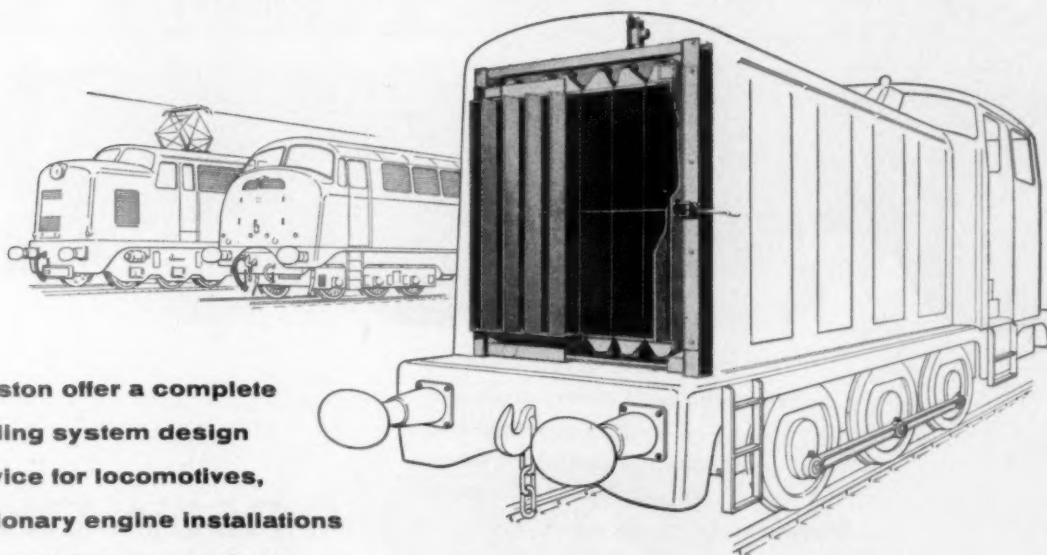
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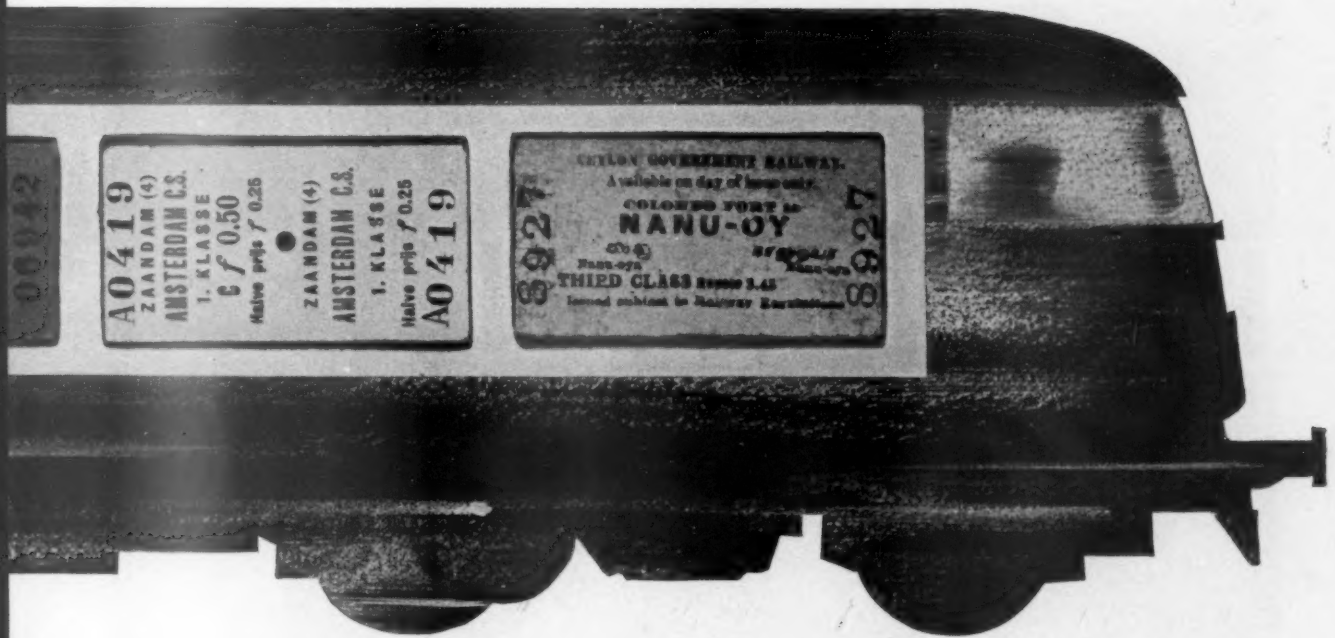
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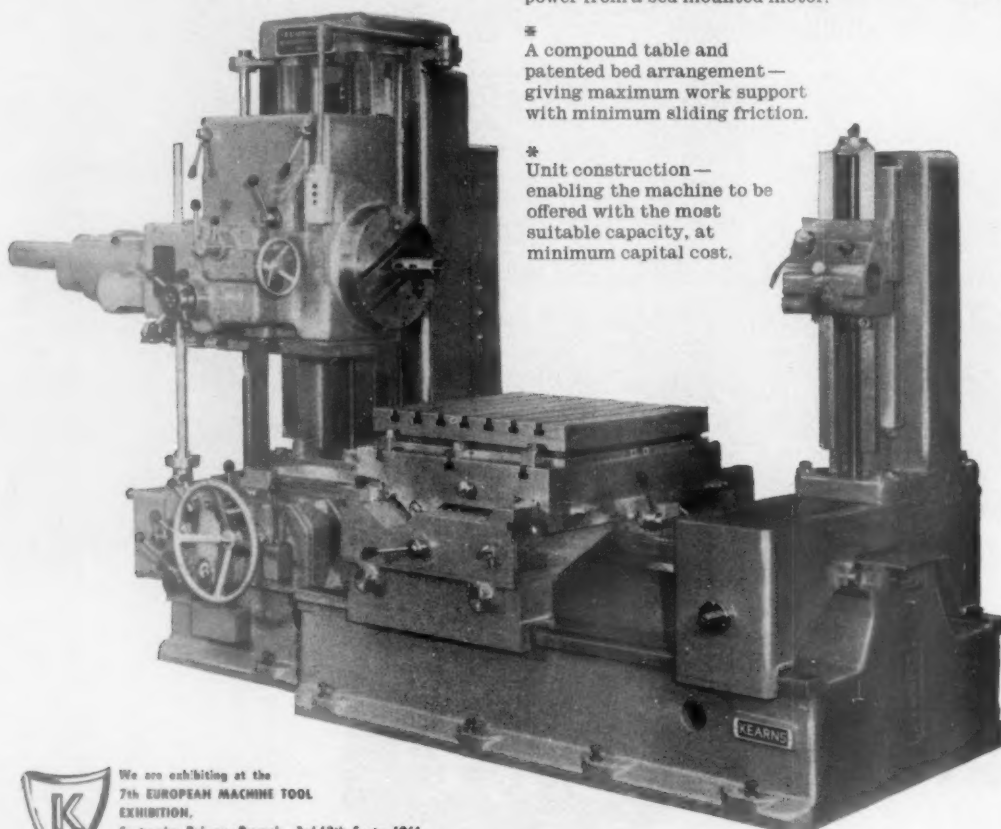
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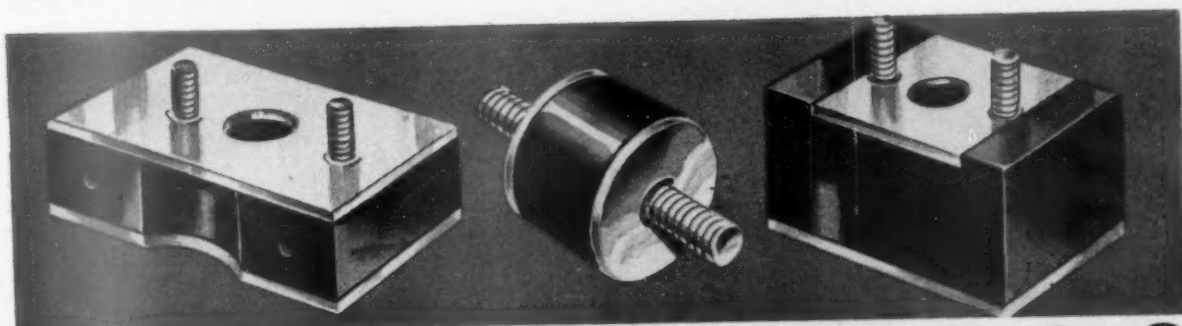
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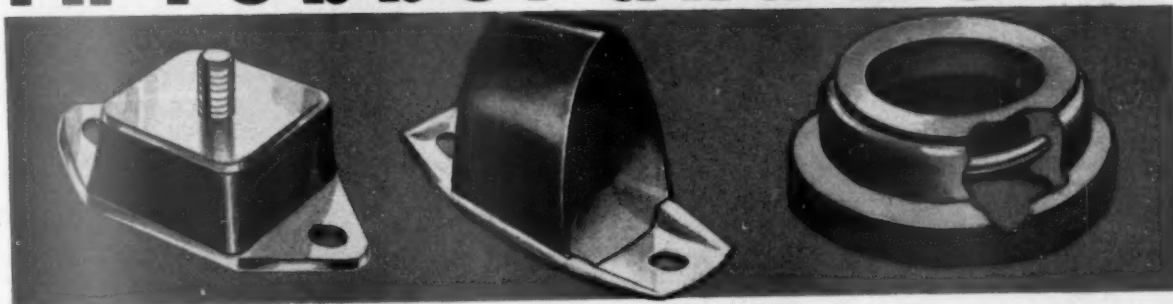
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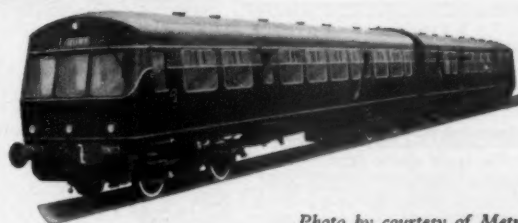
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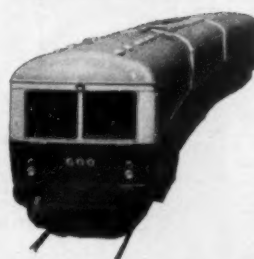
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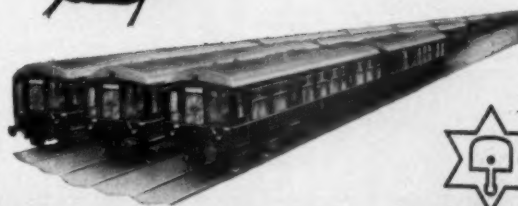
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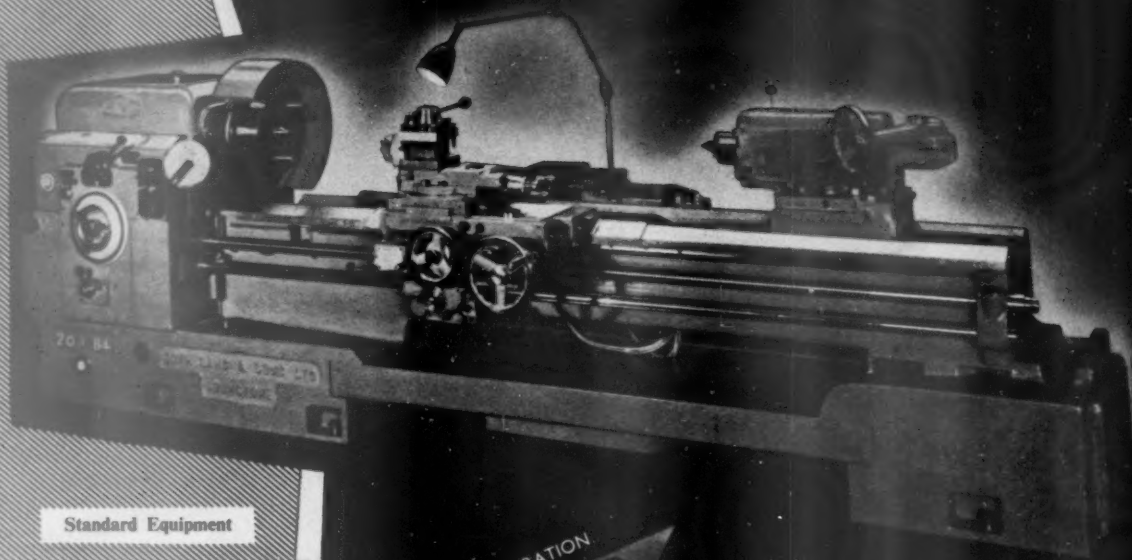
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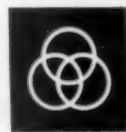
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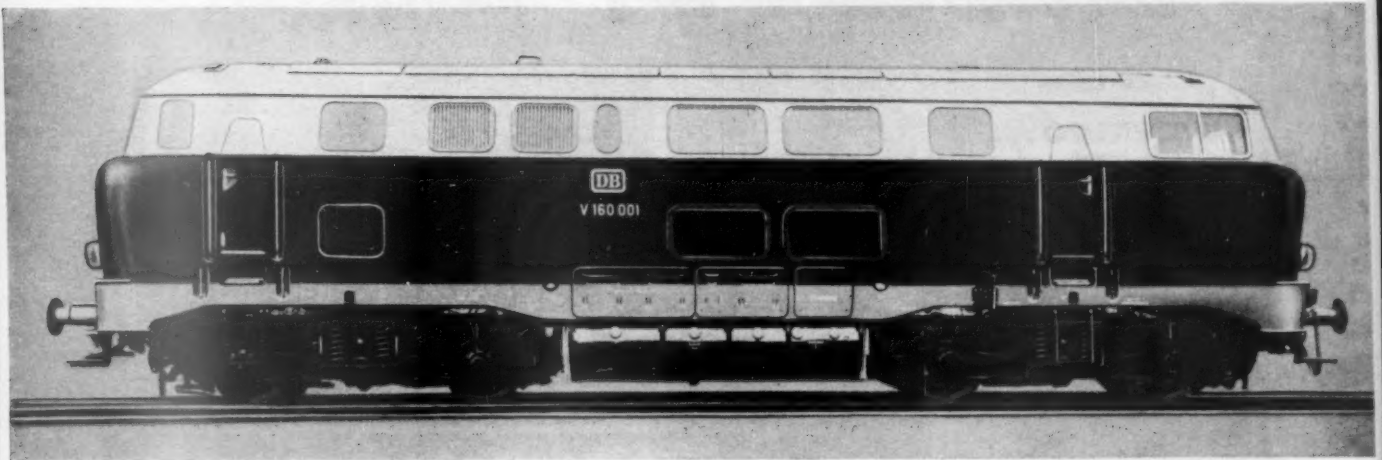
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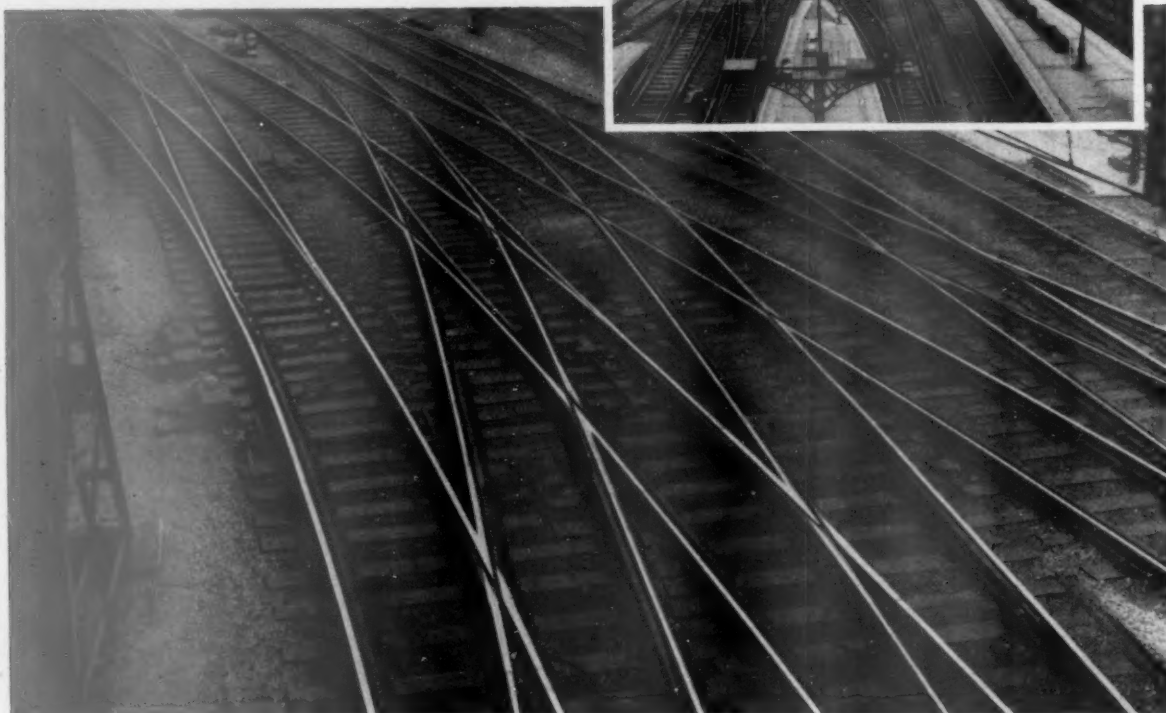
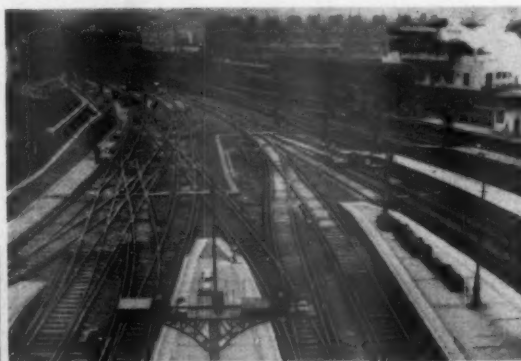
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A Journal of Management, Engineering and Operation

VOL 115

FRIDAY JULY 28 1961

No. 4

CONTENTS

	PAGE
Editorial notes	89
Danish State Railways in 1960-61	91
Western Australian standard-gauge survey	91
Proposed re-location of N.Z. trunk line	91
Steam to electricity in India	92
The development of luxury travel	92
Mid-European summer timetables	93
Letters to the Editor	94
The scrap heap	95
Overseas railway affairs	96
Publications received	97
Signalling and telecommunications in the Eastern Region	98
Oil fuel combustion heaters	103
Tape recorders in marshalling yards	104
Electric railway traction section	105
Personal	111
New equipment and processes	113
Accident at North Belton	115
News articles	115
Contracts and tenders	118
Notes and news	119
Railway stock market and official notices	120

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The Chancellor's measures

THE new measures announced by the Chancellor of the Exchequer last Tuesday to deal with the economic situation were nothing like as drastic and as comprehensive as had been expected. True, he imposed economic restraints in the form of a 2 per cent increase to 7 per cent in the Bank Rate, and a rise of 10 per cent on existing rates in purchase tax and Customs and Excise duties. He called on the banks to restrict "personal consumption" finance and asked for a pause in wage advances until productivity had caught up. He also expressed the view that a further general increase in dividends in the current year was not justified in present circumstances. It is obvious that the Government's intention is to do all it can to impose a temporary wage freeze in the public sector of industry, but there is no clear indication that this will be successful. Apart from a vague reference to the intention to effect some co-ordination between such bodies as the Economic Planning

Board, the National Production Advisory Council on Industry and similar bodies, there was very little that could be called a plan for the future. It is satisfactory, at least, that the Minister stated definitely that he would not interfere with the investment that the nationalised industries required for attaining their financial targets and providing essential supplies and services, but he added that the sums required for assistance for industry will fall away next year and very strict criteria would be applied to any new proposals. It is to be hoped that this means that the railway's modernisation plan is not again to suffer interference. It is very difficult to see how the Chancellor's action will assist the export trade. There can be no doubt that the increase in the Bank Rate will add to the cost of financing exports. With higher prices arising from the increased purchase tax on a wide range of consumer goods, it seems optimistic to expect a diminution in wage claims. All-in-all, the Chancellor's proposals savour far too much of the medicine as before and would appear to be based on short-term rather than long-term thinking. Unless he can show greater ingenuity than this, and, in particular, can find some way of assisting exporters and those who finance them, he would seem to be in need of a new set of advisors. The prescription that was handed out on Tuesday has been well-tried but has not been successful in effecting any long-term cures.

The late Mr. Cuthbert Grasemann

THE death on July 23, at the age of 71, of Mr. Cuthbert Grasemann removes the last of the chief public relations and publicity officers to have served the railways at the time of nationalisation. Succeeding Mr. (now Sir John) Elliot, then Public Relationship Officer of the Southern Railway, as Public Relations & Advertising Officer in 1930, Mr. Grasemann proceeded to re-shape and develop railway public relations and publicity, assuming responsibility for the company's commercial advertising as well as its other publicity. Unlike so many engaged today in the profession of public relations, Mr. Grasemann had an extensive background in the industry he served: the son of a railwayman (Mr. C. E. Grasemann, a former Chief Goods Manager of the London & North Western), he himself had served on the railways since 1912, when he joined the South Eastern & Chatham after gaining advertising and printing experience with a commercial undertaking.

The late Brigadier Manton

BRIGADIER L. MANTON, who died on July 23 at the age of 74, will long be remembered as the first Principal of the School of Transport at Derby, and the creator and spirit of that institution. During his 20-year principalship, the school steadily grew in achievement and reputation, and its success today is based very firmly on the strength of its early foundations. Before going to Derby, and during a distinguished military career in which he served with the Indian State Railways on both construction and traffic sides, Brigadier Manton commanded the Railway Training Centre at Longmoor for four and a half years. He had also been Instructor in Transportation at the School of Military Administration, Assistant

Director of Transportation in Egypt, and Chief Engineer, Malta, and Director of Transportation in India.

Award for "Blue Pullman" film

THE film "Blue Pullman," made by the British Transport Commission Film Unit, has been awarded first prize in the Technical & Industrial Information section of the Festival of Films for Television, held recently in Rome. This film, produced by Edgar Anstey and directed by James Ritchie, covers the story of the diesel-Pullman train from prototype testing to inauguration. Although it is essentially a documentary, there are plenty of human touches and all the personnel, scientists, engineers, crew and Pullman staff get equal credit for the success of the train. The film is in excellent colour and, by putting it on general release, the British Transport Commission in a striking manner has shown the public not only what is being done by way of providing first-class train services, but also has demonstrated how much care and painstaking research is involved before a new train can be passed as suitable for service.

The modern plate-girder bridge

THE remarkable changes that have occurred in the design of the plate-girder bridge during the past dozen years are lucidly and yet comprehensively described in a recent article by Mr. P. S. A. Berridge, Assistant Engineer, Bridges, Western Region, British Railways. In No. 6 of the quarterly journal of the British Constructional Steelwork Association, "Building with Steel," he points out the advantages of shop welding and permanent erection at site with high-strength friction-grip bolts. The ballasted track on a reinforced concrete deck carried on steel girders seems to have come to stay as also have modern fabrication techniques in the shops, resulting largely in standardisation. This is reflected in the phenomenal reduction in the number of drawings required. The accessibility of all exposed surfaces, shop painting and the adoption of stepped bearings, as well as concrete flooring are all stressed in the article as making for economical maintenance, a primary objective of modern design.

Accident at North Belton

THE tragic accident at North Belton occupation level crossing near Dunbar, on December 2, 1960, illustrated the care with which road users should approach such crossings. As Colonel Robertson's report, summarised on a later page, showed, the driver of the car involved saw an Up train approaching, and thought he could safely cross ahead of it. He entirely failed to see a Down train coming from the other direction, and drove right into it. The car was then thrown into the path of the Up train. The crossing had warning notices which read, "Warning—Level Crossing—Stop—Look—Listen," but the gates had been left open by the owner of the adjacent farm, in readiness for the guests, including the occupants of this car, whom he was expecting. This action of his was unlawful, but all the expected guests were acquainted with the crossing. Colonel Robertson held that had the driver of the car obeyed the instructions to stop, look, and listen, the accident would not have occurred. The train crews were in no way to blame.

Visit of Uruguayan railway delegation

FROM July 19 to July 22 last week, Senor Eng. Don Raul A. Penades, President of the Uruguayan State Railways, visited the United Kingdom with Eng. Victor di Angeli, Member of the Uruguayan Railway Board of Management, Eng. P. H. Bernier, Operating Departmental Manager, and Senor Enrique Campal, both of the Uruguayan State Railways. The delegation arrived at Victoria from Paris by the "Night Ferry" and was received by H. E. Senor Dr. Don R. E. MacEachen,

Ambassador for Uruguay; Brigadier A. E. M. Walter, Chairman of the United Kingdom Railway Advisory Service; Mr. S. J. Bennett, Secretary of U.K.R.A.S., and representatives of the British Transport Commission and of the English Electric Co. Ltd. During the visit, Senor Penades and his party met Mr. J. Ratter, Member of the British Transport Commission and President of U.I.C., and were shown over the Vulcan Works. Mr. H. C. Johnson, General Manager of the Eastern Region of British Railways, gave them a luncheon on July 21, after which they carried out a programme arranged by the Eastern Region. The day before, they had attended a dinner given in their honour at the Charing Cross Hotel by the Chairman and members of U.K.R.A.S.

Old Danish diesel trains

FOR a quarter of a century the 1,100-b.h.p. Lyntog of the Danish State Railways have been among the most celebrated of European diesel fixed-formation trains and, despite the small size of Denmark, have continued to make daily mileages up to 500 between Zealand and Jutland, passing twice a day over the Great Belt on train-ferry ships. Now the time has come for the older Lyntog to be replaced by the most modern equipment which can be found in Europe; and it was with this principle in mind that the D.S.B. examined all long-distance diesel trains in Western Europe, and decided to model their new stock on the German T.E.E. diesel-hydraulic formations. These particular trains normally are run as seven-car sets, but the new D.S.B. trains are to have eight cars, in contradistinction to the three and four cars of the Lyntog, and containing first and second class seats in place of the first class only in T.E.E. services, but are to retain air-conditioning throughout.

New Danish diesel trains

IT was to follow the design of the T.E.E. trains closely, and to reduce the detail-design charges, that the D.S.B. in June placed its order for two new trains with the Nuremberg works of M.A.N., and specified the standard Maybach M.D. 650 engines, Voith transmission, Behr cooling, Knorr airbrakes, and air-conditioning. As the Great Belt ferry-ship tracks can take only four coaches in line, special raised driving positions are being provided at the inner ends of the fourth and fifth vehicles, so that half trains can be driven on and off the ships. Seating accommodation for 72 first class and 165 second class passengers, plus 18 in the restaurant, is being provided in a train length of 495 ft. and on an estimated empty weight of 270 tons. Top designed speed is 100 m.p.h. These eight-coach trains are to have 2,200 b.h.p. of traction power plus two 300-b.h.p. auxiliary sets for train services.

Accelerated timings to the North

SERVICE timings which have been established for the Eastern Region "Deltic" locomotives show substantial cuts in the schedules between Kings Cross and the North. On "The West Riding," leaving Kings Cross at 7.45 a.m. for Leeds and Bradford, the average speed of 72 m.p.h. between Hitchin and Retford will make this the fastest run on British Railways. Operation of these locomotives is being shared between the Eastern, North Eastern, and Scottish Regions, deliveries proceeding at an equal rate to each. Powered by two 18-cylinder Napier "Deltic" apposed two-stroke engines, each rated at 1,650 h.p. at 1,500 r.p.m., the service weight of the production locomotive has been reduced to 99 tons, compared with the prototype weight of 106 tons. These locomotives will all be used on fast passenger services. As the 22 "Deltics" are programmed to replace 55 steam locomotives, a high availability figure will be required. Service schedules are based on an average total mileage of 4,500 a week.

Two-power locomotives

THE new electro-diesel locomotives described on page 102 can shunt trains in non-electrified yards and have enough power to haul them away; or they can run as an electric locomotive with specially-equipped trailers to supplement multiple-unit trains in peak periods; or they can run in mixed formation with multiple-unit stock and vans to provide parcels, mail, or newspaper services; or they could run with ordinary passenger coaches at the tail of a multiple-unit electric train and be uncoupled at some convenient junction to provide a direct service into the outer, non-electrified areas. If traffic considerations necessitate, they can be used at any time as normal electric locomotives. It is usual in two-power locomotives for the diesel installation to be of considerably lower output than the straight-electric equipment. In this case, the choice of 600 b.h.p. for the diesel plant, ample for the planned diesel-electric traffic duties, means that the standard English Electric 4SRKT engine used in the Hampshire diesel-electric trains could be incorporated.

Installation and electric control

THE main generator has different windings, but is interchangeable as a unit. The engine group is installed at one end of the locomotive and the principal electrical equipment at the other, giving a weight balance and keeping heavy items away from the mid-length of the frame. Body width is to the 8-ft. restricted loading gauge, so that the units can operate over the Hastings line. Electric control is of the resistance type, and the four nose-suspended motors can be grouped in series-parallel or full parallel, with four stages of field weakening in each grouping. As the first locomotive, at least, of the six is intended for general freight and light passenger duties it has been matched more or less to the Type 3 diesel-electrics of 1,550 b.h.p.

Danish State Railways in 1960-61

A SOUND national economic position was reflected in the financial results of the Danish State Railways in the year ended March 31, 1961: for the first time since the war these showed a considerable working surplus. During the year there was a slight decrease of about 1.2 per cent in passenger numbers. The drop occurred exclusively in the Copenhagen suburban area, where 74,300,000 passengers were conveyed against 75,900,000 in the preceding year. This decrease, which resulted from the rapidly-increasing number of private cars, occurred in ordinary tickets—season ticket numbers were not affected. The number of tickets sold to or from foreign countries increased from 3,360,000 to 3,720,000, mainly in those sold from Swedish to Danish stations, but also in tickets sold to or from other European countries.

Principal results were as follow:—

Particulars	1959-60	1960-61
Miles open	1,723	1,719
Passengers (millions)	112.8	111.4
Goods (million tonnes)	7.36	7.47
Train-miles	24	24.4
Operating ratio	99.9	95.4
Passenger receipts	239.9	255.2
Goods receipts	209.7	217.4
Gross receipts (all services)	592.6	636.7
Working expenditure	591.9	607.7
Surplus	0.7	29.0
Deficit after charges	81.9	62.7

Goods traffic continued to increase, rising by 1 per cent. A slight decrease in the country's internal traffic was more than offset by a 10 per cent increase in traffic to and from other countries. The considerable rise in receipts also resulted from the increase in rates and fares introduced during the preceding financial year, and that working expenses were rising slightly. The rise in wages and salaries was partly counterbalanced by savings from rationalisation.

Of the 24.4 million train-miles achieved, diesel traction accounted for 19.2 million, a rise of about 3.7 per cent over

the preceding year and the result of placing in service additional diesel-electric locomotives. Only about 2.6 million train-miles are now steam operated, and the same number of train-miles are electrically operated.

Ferry and steamer services continue to be augmented, and it was necessary to put two more ferries and one more steamer in service during the year, so that 28 vessels made 51,545 round trips in the year. On the two Great Belt crossings (Korsør-Nyborg, 16 miles mainly for railways, and Hallskov-Knudshoved, 12 miles exclusively for motor-cars) 56 round trips a day were made on an average, conveying 6,413,000 passengers, 1,136,000 motor-cars, 38,000 railway passenger vehicles and vans, and about 420,000 goods vehicles. This crossing is probably the widest in Europe. The crossing to Sweden between Elsinore and Helsingborg is also very important, conveying 4,518,000 passengers. The important Gedser-Grossenbrode route to Germany conveyed 1,316,000 passengers. Despite the rapidly-growing number of private motor-cars the State Railways' bus routes are still growing. The fleet of 526 buses now runs on 3,870 miles of route.

Western Australian standard-gauge survey

THE Commonwealth Government has announced its approval to the carrying out of a survey between Kalgoorlie and Kwinana for the proposed standard-gauge link with the Eastern States at an estimated cost of £100,000. This is presumably the location survey. Work has already begun and the Western Australian Government Railways will speed up the work within the next few weeks. Much has been done along the Avon Valley route between Northam and Midland Junction, and no time will be lost in commencing the survey between Northam and Kalgoorlie, and from Southern Cross to the iron ore deposits at Koolyanobbing. It is proposed that the section between Northam and Midland Junction be completed by Railway Departmental officials, and the Northam—Kalgoorlie section be let by contract.

The estimated cost of the complete standard rail project is about £41 million, and construction of the standard-gauge line, if approved, would take about 6½ years, but the Minister for Railways has announced that it is hoped to reduce this time by about two years, to give Western Australia the maximum benefit of the combined impact of the £80 million combined rail-steel undertaking under which the Broken Hill Pty. Co. will build an integrated steel works in Western Australia.

It is estimated that the new line would save the Railway Department at least £1,600,000 and show a 7 per cent return on capital invested. It would give a new impetus to Western Australian development and, in helping the decentralisation of Australian industry, notably at Kwinana, would be a contribution toward reducing the growing distortion of economic balance between Eastern and Western Australia, besides being highly advantageous to the rehabilitation and financial operation of the Western Australian railway system.

Proposed re-location of N.Z. trunk line

ON the Wellington-Auckland main trunk line of the New Zealand Government Railways there is a particularly weak section between Mangaweka and Utiku, weak not only because of instability but also as a result of traffic limitations. These include 1-in-60 gradients, a tortuous alignment with very sharp curves, six tunnels restrictive of load dimensions, and the longest of the high viaducts on the system now increasingly costly to maintain. Moreover, the country through which it passes is such that no effective improvement can be made on the existing alignment along the deeply-cut Rangitikei River.

It has been obvious for some time that this section and No. 1 State Highway which parallels it, would have to be re-located, as both are liable to slips and washouts, their routes being generally insecure. The future of the viaduct, 946 ft. in length

and 158 ft. in height, caused special anxiety because of its size. The condition of the whole section on both rail and road necessitates extremely slow and, in some ways, difficult progress of traffic.

All things considered and with the realisation that within a few years reconstruction and relocation were inevitable, it was decided to carry out an exhaustive survey of the area, not only on land but also from the air. This showed that the most suitable route appeared to be a deviation to the eastern side of the Rangitikei River. This realignment will not be easy or cheap, for it will necessitate the construction of at least two and possibly three large bridges of great height, probably 240-250 ft. above water level. The first and third would be over the Rangitikei near Mangaweka and its re-crossing near Utiku. Also, if the most direct route is followed, the Kawatau River, a tributary of the Rangitikei, must be bridged. On the other hand, earthwork should be relatively light. The re-located line would be about half a mile shorter than the existing route; the ruling gradient would be 1-in-100 instead of 1-in-60, and the sharpest curve 30-ch. rad. as opposed to 10-ch. at present.

Train loads could thus be increased from 550 to 700 tons, or in similar ratio according to the motive power in use. On this line, where 20 goods trains are run daily, this is of considerable importance, but in addition maintenance and operating costs would be greatly reduced. Nevertheless, it seems improbable that the costly outlay of a re-location can be faced before 1963.

Steam to electricity in India

REASONS behind the decision to replace steam with electric traction in India to the greatest extent possible were explained in a recent issue of *Railway Electrification* by Mr. H. D. Awasty, General Manager & Chief Engineer, Railway Electrification, Calcutta. The Railway Electrification administration has been set up for carrying out this work on the Indian Railways and has been producing a technical bulletin for the past 12 months. Its April-May issue, in which Mr. Awasty's article appeared, was the first in a new magazine format which allows wider use of illustrations, charts, and diagrams. Increase in line capacity, thermal efficiency, and reserve of power were among the advantages quoted for electric traction, and reference was made to the full locomotive weight being available for adhesion in electric units. Having adopted the 50-cycle system and rectifier locomotives, the Indian railways can exploit this characteristic to the utmost, as the rectifier principle has demonstrated its freedom from the tendency for wheelspin, once set up, to be aggravated, as may occur in d.c. locomotives when starting heavy loads with their motors in series. There is an interesting parallel between the priority given in India to electrifying routes, serving the steel industry, and the choice of the 50-cycle system by the French National Railways in 1951 for the heavy mineral traffic in the Valenciennes-Thionville area. These were the duties on which the rectifier locomotive first showed its capabilities in heavy haulage to their full extent, and it was from this nucleus that the French railways developed their present widespread 50-cycle network carrying traffic of every kind.

Mr. Awasty makes it clear that the decision to use alternating current at 50 cycles in India was a difficult one to make, and he enumerates some of the problems involved as well as the example of the German Federal Railway in retaining the low-frequency system for its present extensive electrification programme. He notes that "almost all other advanced railways are adopting 50 cycles per second," and that "the growing consensus of opinion among the highest technical authorities favours the 25,000-V. alternating-current single-phase system." In making the same decision the British Transport Commission also was alive to the fact that it was in this direction that the best prospects of technical progress lay, and that a choice in favour of one of the older systems might prevent advantage being taken of new developments. These

need not be specifically applicable to railway traction in the first instance. The attraction of the 50-cycle system is that it puts railways in the main stream of electrical development. The results of this are apparent already in the application of semi-conductor rectifiers to locomotives, and numerous other uses of semi-conductor devices can be foreseen. New speed-control systems, at present aimed only at machine tools and forklift trucks, may well in time form the basis of schemes which could drastically reduce the amount and size of mechanical switchgear required in a locomotive. In turning at this time to producing equipment for railway electrification, Indian industry has unusual opportunities for original work. Specifically, Mr. Awasty mentions that the Indian Telephone Industry, Bangalore, "has made a magnificent effort to develop a large range of new equipment. A number of firms are making overhead equipment of special metals. A factory has been set up in the South to make high-voltage solid-core insulators and Indian industry has succeeded in making contact and catenary wires of as high a quality as anywhere in the world."

The development of luxury travel

THE change in European travel habits during the past half-century provides a study of considerable interest. Up to the 1914-1918 war, railways in general had a monopoly in fast travel, and could exploit its possibilities in various profitable ways. In Europe the famous *trains-de-luxe*—the "Orient Express," "Nord Express," "Rome Express," "Sud Express," "Côte d'Azur Rapide" and others—made up entirely of the International Sleeping Car Company's sleeping- and dining-car stock and at a higher speed than other services, could require heavy sleeping-car supplements in addition to first class fares, and furthermore a surcharge of from 20 to 50 per cent above the latter. In the United States, similarly, trains such as the "Twentieth Century Limited" and the "Broadway Limited," at nothing but Pullman rates and with a handsome service charge as well, could command their exclusive *clientèle*; exceptional standards of comfort and speed again were the attraction.

Between the wars a profound change set in. Travel by air had become a serious competitor, and had begun to skim the cream off the first class traffic to such an extent that the European *trains-de-luxe* no longer could be confined to first class passengers only. Second class sleeping cars appeared in their formations, and then, by degrees, first and second class coaches also; in most cases the supplementary fares were abolished, and although these expresses retained their names, their distinctive character had gone. Rail speeds were steadily rising, but it needed a new type of motive power—diesel-electric traction—to give the boost which had become essential if the inroads of air competition were to be met. The year 1932 saw the introduction in Germany of the diesel-electric stream-line "Flying Hamburger," soon accelerated to run between Berlin and Hamburg at an average speed of 77 m.p.h., and needing maximum speeds up to 100 m.p.h. for timekeeping.

By the outbreak of the second world war, in 1939, the German State Railways had a network of these diesel stream-line trains in operation, with no fewer than 32 runs timed at over 75 m.p.h. from start to stop, to a maximum of 83.3 m.p.h. By contrast with former first class exclusivism, these trains were all second class only, though with supplementary charges in recognition of their speed. This German enterprise had world-wide repercussions, particularly in the United States, where it set in motion the wave of diesel-electric-locomotive construction that has practically swept steam from American rails. It also made possible acceleration on such a scale as to cut a complete day off some of the longer transcontinental journeys.

With the increasing loss of passenger traffic to the air, a democratisation of what had previously been all-Pullman trains began in the U.S.A. also, greatly assisted by the intro-

duction of the reclining-chair cars which made long-distance travel so much more comfortable for the "coach" or second class passenger, especially by night. New "all-coach" trains, as fast as the previous all-Pullman passenger fliers, began to appear, such as the Chicago-Los Angeles "El Capitan" of the Santa Fe, the New York-Chicago "Pacemaker" of the New York Central and "Trail Blazer" of the Pennsylvania, and the "City of New Orleans" of the Illinois Central.

Since the 1939-1945 war an entirely new concept in international rail travel in Europe has taken shape, mainly on the initiative of the Netherlands Railways—the network of "Trans-Europe Express" trains linking Holland, Belgium, Germany, Switzerland, France, and Italy. Over distances of, say, 300 to 500 miles, railways can still compete effectively with the air, partly because their trains can work into and out of the heart of cities, whereas air passengers may have to spend a considerable time in travelling by road between airports and city centres; and also because passport and customs examinations can be conducted in the trains instead of wasting the passengers' time at airports. The day has come when, instead of stops at frontier stations for 20 to 30 min. for the various formalities, "T.E.E." trains can halt for as little as 2 min., or, in the case of some of them, such as those between Paris and Brussels or Zurich and Milan, make no frontier stop at all.

The interesting point about these trains is that they bring back the *trains-de-luxe* principle of first class only, with supplementary fare, though now without any night travel. Indeed, a train like the German "Parsifal" permits an executive to have a full morning in Hamburg for business, and then, averaging over a mile a minute in great comfort for the whole distance, to be in Paris in time to sleep; the "Helvetia" gives him the same facility, and permits him to sleep in Zurich. With the German "Schauinsland," the Swiss "Ticino" and the Italian "Settebello," a passenger can travel all the way from Frankfurt, in the heart of Germany, to Rome without night travel. Even with the supplements charged for the use of these trains, allowing for the change in the value of money, this swift and luxurious travel costs less than the sleeping car accommodation of the former *trains-de-luxe*.

In Europe the number of internal services of the various countries carrying first class passengers only at high speed, with supplementary charges, steadily increases. In France there are the extremely fast Paris-Nice "Mistral," the Paris-Hendaye "Sud Express," the four Paris-Lille 2 hr. 10 min. trains, and many others, all electrically hauled; in Italy a similar series, headed by the Milan-Rome "Settebello" and the Milan-Naples "Vesuvius Arrow," many electric but some diesel railcars, have transformed Italian travel; and in Germany a collection of diesel streamline trains once again crosses the country in all directions. Runs timed from start to stop at from 70 to 75 m.p.h. have become common, and in France electric haulage has now made possible runs booked at over 80 m.p.h., such as the 82 m.p.h. of the "Mistral" and the "Cisalpin" from Paris to Dijon.

The only strictly comparable service in Great Britain is the first class only "Midland Pullman," faster than any previous train between London and Manchester though still well below the Continental level of first class speed. American railways, now fighting the competition of coach services over elaborate motorways that are but little slower than the trains, and the far faster air travel, are in a less happy position, and the reduction in the number of the exclusive trains of the past by combination with their more democratic companions still continues. European railways, however, with the progressive developments described, appear at least to be holding their own.

Mid-European summer timetables

THIS summer, the continuing process of acceleration on the German Federal Railway is being of considerable benefit to certain transcontinental trains. The first-class diesel train "Schauinsland," previously 7.40 and now 7.45 a.m.

from Frankfurt, booked at an average of 64.3 m.p.h. to Basle with five intermediate stops, has been extended through Switzerland to Zurich, arriving at 12.16 p.m. and connecting with the new 12.40 p.m. 4-hr. T.E.E. train "Ticino" for Lugano and Milan. In the reverse direction, the Basle-Frankfurt-Hamburg train "Roland," also diesel and first class only, is starting from Zurich at 12.32 p.m., in connection with the 8.20 p.m. T.E.E. "Gottardo" from Milan, and, as in the reverse direction, will provide a fast service in just under 9 hr. between Milan and Frankfurt, as well as various useful Swiss connections.

The southbound "Riviera Express," now leaving Amsterdam 9 min. earlier, at 4 p.m., has been accelerated through Germany to arrive in Basle 72 min. earlier, at 1.39 a.m.; Genoa is reached at 10.50 a.m., 57 min. earlier. In the reverse direction, starting from Genoa at 7.38 instead of 6.34 p.m., the "Riviera Express" is unchanged in arrival time at Cologne and Amsterdam. From west to east the "Orient Express," leaving Paris 50 min. later, at 9.15 p.m., regains its previous times between Strasbourg and Stuttgart, and, with a 50-min. acceleration east of that point, reached Vienna at 3.40 p.m. No sleeping cars or through coaches now run beyond Vienna, but a new Austro-Hungarian diesel train at 3.15 p.m. from Vienna, averaging just over 60 m.p.h. over Hungarian metals between the frontier station of Hegyeshalom and Budapest, gives an arrival in the latter city at 7.24 p.m., a total gain of 2 hr. on the previous Paris-Budapest times. A similar new service at 9.36 a.m. from Budapest, 3 hr. later than the former "Orient Express" departure, connects with the latter at Vienna (1.40/2.0 p.m.), and passengers reach Paris 23 min. earlier, at 8.37 instead of 9 a.m., an overall gain of nearly 3½ hr.

A number of journeys can now be made throughout the length of Western Germany at an average speed of over a mile a minute. The T.E.E. train "Helvetia," Hamburg-Zurich, averages 62.0 m.p.h. over the 536½ miles between Hamburg and Basle, with five intermediate stops. The "Parsifal," Paris-Cologne-Hamburg, has been accelerated to run each way between Aachen and Hamburg in 5 hr. 18 min., at an average of 65.3 m.p.h., and over the entire 585 miles between Paris and Hamburg, with ten intermediate stops, maintains a mean speed of 61.2 m.p.h. The "Rheingold Express," this summer leaving Basle 9 min. later, at 2.43 p.m. from the Swiss station, but recovering its previous time by Rotterdam, averages 62.9 m.p.h. each way over the 316½ miles between Basle (Badischer) and Cologne, with six intermediate stops. There are now numerous runs in Western Germany timed at over 70 m.p.h. from start to stop, the fastest that of the "Helvetia" between Baden-Oos and Freiburg, 63.9 miles in 52 min., at 73.7 m.p.h.

One useful development in the German summer timetable is the provision of several additional trains in each direction between Cologne, München-Gladbach, and Venlo, where they tie in with the even-interval Dutch service and continue to Rotterdam and The Hague, or, in one case, to Utrecht and Amsterdam. These trains are at 9.30 a.m. from Cologne to Amsterdam, and at 2.31, 4.20 and 6.10 p.m. from Cologne to The Hague, with an additional train at 8.45 a.m. from Düsseldorf to The Hague. A similar service is given in the opposite direction.

In Eastern Germany there have been accelerations on a considerable scale. The average time between Berlin and Halle has come down by no less than 52 min., and the fastest time for the 101 miles to 2 hr. 8 min., twice daily each way. Between Berlin and Dresden the average reduction is 27 min., with additional trains. The three daily through trains between Berlin and Karl-Marx-Stadt (formerly Chemnitz), hitherto averaging all but 5 hr. on their journeys, now have had their times cut to an average of 3 hr. 31 min. The quickest of the trains referred to are a new series of "D" class expresses introduced by the State Railways, on which extra fares are charged and reservation is compulsory. Their speeds are still far below those that obtained before the war, but they do show a

substantial advance on anything that has been tried in East Germany since the war ended.

Another new train of great interest that has been introduced with the summer timetable concerns Italy, Austria, Poland and the U.S.S.R. It is called the "Chopin" and operates daily between Moscow and Vienna. Through first class sleeping cars run daily between Moscow and Warsaw, Warsaw and Vienna and Warsaw and Prague; on alternate nights between Moscow and Vienna and Moscow and Prague; and on alternate nights also between Moscow and Rome. The last-mentioned is

worked forward from Vienna on a new 11.20 a.m. train *via* Tarvisio and Venice, which nightly carries a through Vienna-Rome sleeping car. From Moscow the journey starts at 6.25 p.m.; the coach bogies are changed at the frontier station of Brest-Litovsk, and Warsaw is reached at 6 p.m. the following evening. The run from Warsaw to Vienna starts at 7.30 p.m., takes 12 hr., and there is then a wait of 3 hr. 50 min. before the sleeping cars proceed at 11.20 a.m. Rome is reached at 8.45 a.m. the following day. The opposite service has similar waits in Vienna and Warsaw on this 3½-day journey.

LETTERS TO THE EDITOR

THE EDITOR IS NOT RESPONSIBLE FOR THE OPINIONS OF CORRESPONDENTS

EUSTON STATION

July 21

SIR, It is sad indeed that the Doric Arch must go, after all the efforts that have been made to save it, but is it quite out of the question to raise the £190,000 necessary for this purpose by public subscription combined with outside assistance?

The L.C.C., obviously a deeply interested party, is prepared to contribute substantially to its re-erection and it seems to me to be a matter of some sufficiently interested member of the general public getting "the ball rolling."

In reference to the Arch and the Great Hall, "Country Life" has recently truly said that London is "not so well stocked with fine architecture that she can afford to lose her two finest monuments. For there is no doubt that the Great Hall at Euston and the Doric Arch can be so described: the former among the grandest renaissance buildings in England, the latter both the culminating achievement of the Greek revival and a proud symbol of the days when British railways created masterpieces instead of destroying them."

As this journal goes on to suggest, the very necessary reconstruction of Euston station seemed to provide the opportunity of re-erecting the arch—now so obscured by subsequent development—in a position where it would again show to advantage. One feels that there is so much of *real* historic interest in the old Euston—the world's first trunk-line terminus—that, with thought and planning, might well be embodied in the new Euston and it is greatly to be hoped that every effort will be made to do this.

Yours faithfully,

J. P. BARDSLEY

c/o The Royal Commonwealth Society,
Northumberland Avenue, W.C.2

RAILWAYS INTO ROADS

July 20

SIR, I was interested in the information supplied by Mr. C. Hamilton Ellis but I notice that he conveniently left out all mention of train speeds, nor did he tell us how many consecutive trains run with a headway of 90 sec. on the London railways to which he referred.

The facts that I am trying to unearth are how many miles of railway track are carrying enormous numbers of passengers (10,000 or more, per single line, per hour) and why it is that there are so many London commuters who can barely remember the last time they had a seat?

In pointing out that only eight lanes of motorway would be needed to move 240,000 passengers an hour, all of them seated in comfort, I fail to see how Mr. Hamilton Ellis arrives at the conclusion that we need more railways (except, perhaps, on sentimental grounds).

So far as Chicago City expressways are concerned, the auth-

orities have already tried an electric railway on the medial strip of the Congress Street expressway. The fact that the new south-west expressway's medial strip is to contain a special road for buses instead of a railway shows that railbound transport leaves much to be desired. It will be most interesting to see how many passengers this bus system carries. I think that the main problem will be to test the system to saturation point as the passenger capacity will be so colossal.

Yours faithfully,

A. I. WATKINSON

3, Otley Road,
Harrogate, Yorkshire

RUBBER SUSPENSION

July 13

SIR, I am afraid your anonymous contributor has been misled by the editing of my letter published in your issue of June 2, 1961. I wrote "the static vertical deflection of the bolster springs is 5½ in." Unfortunately, "car" became substituted for "bolster."

The total static deflection of the Metalastik main-line bogie suspension is 7½ in. at tare and 8½ in. laden.

No Metalastik bogie has ever shown any tendency to hunt. The main-line bogies have now run nearly 70,000 miles, at which mileage many conventional bogies would be hunting violently. Your contributor asserts that the Metalastik suspension units cannot prevent hunting: the plain fact is that they do.

Regarding lateral stiffnesses, we equate the Metalastik bolster springs to equivalent swing link lengths. In the current series of articles entitled "Carriage and railcar bogies, their design and development," by J. L. Koffman, swing links of 16 in. to 20 in. are recommended. The length of the equivalent swing link for the Metalastik main-line bogie is 30 in. In fact, it is very simple to obtain almost any equivalent swing link length with Metalastik suspension by merely changing the plan angle of the bolster springs.

Metalastik Limited is justifiably proud of its first attempt to design bogies for main-line service. Except for lowering the bolster springs by 4½ in., these bogies literally went straight from the drawing board into service. Official reports prove that they perform at least as well as the British Railways standard bogie which required well over 100 years to develop.

Apart from replacing the friction damping on the bolster springs by hydraulic dampers, the only modification we would wish to carry out is to place the high-deflection bolster springs outside the bogie frame. There is no need for "a rubber suspension of appreciably greater size and complication than the one shown in the aforesaid letter."

Yours faithfully,

F. E. SHEPPARD
Group Sales Manager (Railways)

Metalastik Limited,
Evington Valley Road, Leicester

The Scrap Heap

Forceful if paradoxical

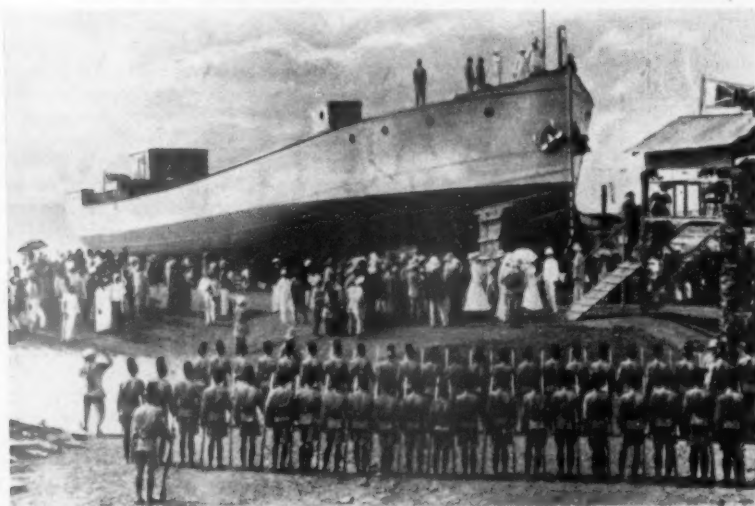
Sign at a level crossing in Alabama: "Don't race trains to crossings. If it's a dead heat, you lose."—From the "Daily Express," July 6.

Railway enthusiasts in Victoria

The Victorian School Railway Clubs Association has published an attractive illustrated leaflet explaining its activities and aims. Founded in 1958, it includes in its membership practically all the school railway clubs in Victoria, and publishes its own journal. Headmasters supported the Victorian Railways' contention that clubs at their schools would contribute to the boys' development, bringing out qualities of leadership and organisation and interchange of ideas; hence its foundation. The railways have agreed to supply official up-to-date news items, literature, maps and films. Most of the affiliated clubs have book and map libraries and clubrooms. Train tours are arranged and visits are paid to signal-boxes and workshops. Photographic contests are held and clubs often construct model railway layouts and organise exhibitions.

Do-it-yourself launching

The ss. *Nyanza*, one of the East African Railways & Harbours' Marine Services on Lake Victoria, was launched at Kisumu in 1907. At the launching the ship refused to move down the slipway at the appropriate moment and the frustrated launchers adjourned for lunch. While they were occupied with the meal



ss. "Nyanza" before the attempted launching



Stamps and postmark commemorating Daimler-Benz anniversary

the vessel launched itself. The illustration below shows the panoply for the original ceremony.

Stamping it in

On July 3, special Daimler-Benz postage stamps were issued at German Federal Post Offices. The stamps bore the special postmark of the Post Office at Untertürkheim, Daimler-Benz's home town. The cover contained a press release to the effect that July 3 was the 75th anniversary of the day on which Carl Benz and Gottlieb Daimler created "the first practical car with a gasoline engine" and a power tricycle.

Stranded

The following conversation is reported to have taken place at Waterloo underground station between two Japanese visitors and an Englishman.

"Which way to Charing Cross?"

"Charing Cross Station?"

"Yes."

"Go down there. Take the next train. Do not get out at Charing Cross Station because that is the Embankment. Go on and get out at the Strand because that is Charing Cross Station."—From the "Evening News," July 25, 1961.

The pyjama game

A man's stroll in the middle of the night took him across several main roads and over Feltham West railway crossing. In his pyjamas—and in his sleep.

Loitering with intent

An engine driver told Woking Juvenile Court today he saw two boys lean over a bridge near Woking and drop a milk bottle which smashed on to the tender as the train passed beneath them. After the police had been called, the boys were found by the bridge with two more milk bottles each filled with stone chippings. "We were waiting for the next train," one of the boys told a police constable. They were each fined 15s.—From the "Evening Standard," July 24, 1961.

50 years ago

The half-yearly report of the Brighton Railway states that the electrical trains on the South London Railway continue to work very successfully, and that traffic is increasing. The system is to be extended to other suburban areas.—From "The Railway Gazette," July 28, 1911.

Were Barclays bitter?

Old banknotes worth £4,000 were stolen from a train between Wellington, Salop, and Crewe recently. The money was being returned to the Bank of England by a branch of Barclays Bank and was contained in a mail bag.

OVERSEAS RAILWAY AFFAIRS

FROM OUR CORRESPONDENTS

INDIA

Sealdah remodelling

To cope with the expected 70 per cent increase in passenger traffic, Sealdah Main and Sealdah North stations, which adjoin, are being remodelled. Among the works involved are a new platform for the Main and side-dispersal platforms for the North station. The Main station building is to be replaced by a new one between the two stations, as well as a multi-storey station building on the east side of the Main station. North station platforms are being extended by 80 ft. The bridge over the Circular Canal, within station limits, is to be widened to carry two extra roads and that over Narkeldanga Main Road to take a further three. Signal cabins A and B are being replaced by a single cabin equipped for electric automatic route-relay interlocking.

Indian tenders for export coaches

Quotations are being submitted through the State Trading Corporation of India for coaches to be built by the Integral Coach Factory, Perambur, Madras, in response to enquiries by other countries. A tender has been submitted for 80 all-steel lightweight coaches for Pakistan and proved to be the lowest. Against the Argentine Railways' call for tenders for 90 broad- and 80 metre-gauge coaches, the Indian tender was the second lowest. As Indian representatives have also visited other Southeast Asian and Middle-Eastern countries to explain their country's ability to construct different types of coaching stock of various gauges



Three new General Motors diesel-electric locomotives at Antofagasta Station

for export, it is hoped that India will be included among those countries asked to make tenders.

CHILE

More diesel-electrics

Six General Motors GR12 type diesel-electric locomotives, have been acquired by the Antofagasta (Chili) & Bolivia Railway Company for service between Antofagasta and Calama.

QUEENSLAND

New railway for export of coal to Japan

Each year, for the next four years, half a million tons of coal will be exported to Japan from the Kianga-Moura coal-field in Central Queensland. The contract is estimated to be worth about

£A8 million. This year, 300,000 tons, valued at £A1,200,000, will be shipped through Gladstone. Plans for a new railway from Kianga to Gladstone will be finalised following the visit to Queensland next week of a Japanese mission of coal and steel experts.

Closure of unremunerative lines

Nine unremunerative lines were scheduled for closure on July 1; their aggregate length was 248 miles, and it is estimated that their closure will save £250,000 a year. Five other lines were closed last November, and now 16 more are marked for immediate closure. Twenty-six non-paying lines are not to be closed, but 10 others remain under close watch.

VICTORIA

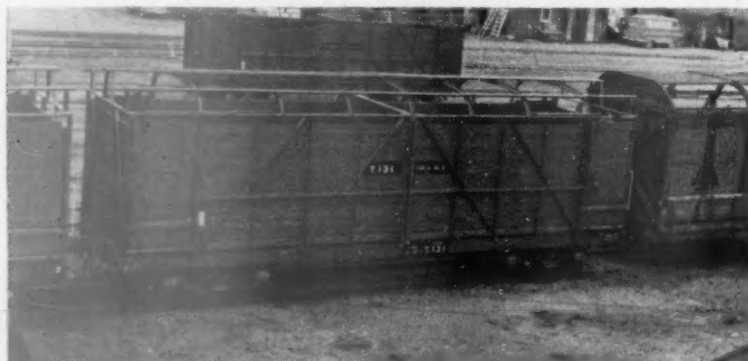
Melbourne Underground

On May 8 preliminary work began with a view to the construction under the City of Melbourne of an underground railway. Preliminary work at the moment consists of making five test bores with diamond drilling equipment. The first bore was sunk in Exhibition Gardens and engineers from the Department of Mines took samples from it for testing in Melbourne University. The other bores will be in those gardens and in Latrobe Street, and they will be taken down to between 80 ft. to 120 ft.

Melbourne-Albury standard-gauge line

By the beginning of July at least 110 miles of track on the Melbourne-Albury standard-gauge line had been laid, and a ballast train based on Wodonga was being used to consolidate the permanent way and supply ballast where

FREIGHT ROLLING-STOCK IN NEW ZEALAND



Class "T" cattle wagons at Palmerston North

required. It will work progressively toward Melbourne as the sections of track already laid are linked up. The heaviest work still to be completed is in the Seymour and Broadford areas and in the Melbourne suburban district. The steel cylinders of the new bridges over Moonee Ponds Creek near North Melbourne are being filled with concrete and the nearby ramped approach to the long flyover, crossing 20 5-ft. 3-in. gauge tracks, is being constructed. Buildings including an inwards parcels office at Spencer Street are in hand.

CANADA

Unusual road bridge over multiple tracks

A road overbridge spanning the Canadian National Railways yard at Edmonton has been built at a cost of some £267,860. It is no less than 1,100 ft. in length and is built on rising gradients of 1-in-20 meeting at the centre of the bridge to provide a minimum headway of 23 ft. 6 in. above rail level of a large number of tracks. For this reason the three central piers are of box-girder plate steel, the remaining shorter eight piers and the abutments being in concrete. The con-

tinuous spans comprise seven 3-ft. wide-flange steel beams, the outer ones being at 245-lb. section and the remainder of 230-lb. Each beam is strengthened with a 15-in.-wide coverplate on the bottom flange. The bridge carries a four-lane roadway deck and sidewalks. There are 1,180 tons of structural and 335 tons of reinforcing steel. Erection was at the rate of 80 to 100 tons a day.

NEW ZEALAND

Loss on operation

The actual working loss on the whole of the New Zealand Government railway system last year was £72,759. The loss on suburban passenger train operations was £874,000.

TURKEY

Agreement on railway to Soviet border

An agreement was recently signed in Ankara between the Turkish and Soviet Governments regarding reciprocal rail facilities between the two countries. Work on converting the line to the Soviet border to standard gauge is well under

way and revised arrangements were decided on for the transfer at the change-over point to the Russian broad-gauge track.

Ankara-Istanbul acceleration

The General Manager of the State Railways stated on April 25 that schedules on the Ankara-Istanbul run are to be speeded up and that 15 diesel trains are to be imported from Italy and 12 electric trains from France. A ten-year development programme for the railways has been prepared.

NORWAY

Train hostesses appointed

The Norwegian State Railways have instituted an experimental service on express trains between Oslo and Stavanger, Oslo and Bergen, and Oslo and Trondheim. Thirteen young ladies have been employed as hostesses on the trains, and will act as a liaison between the passengers and the train staff, answer questions, hand out brochures, take food orders, and generally make the journey as pleasant as possible for the passengers.

PUBLICATIONS RECEIVED

Merkblätter der Geräuschbekämpfung im Fahrzeugbau. Eisenbahn-Kraftfahrzeug-Schiff. (Data sheets concerning noise reduction measures in vehicle design. Railways, motor vehicles, ships.) By Dr.-Ing. Dietrich Zboralski. Frankfurt (Main), Dr. Arthur Tetzlaff Verlag. 8½ in. x 6 in., 76 pp. Illustrated. Flexible plastic cover. Price DM. 4.80. The problems involved in taking noise abatement measures at the design stage have assumed great importance in vehicle construction. Their solution calls for specialised knowledge in the sphere of applied physics which the vehicle designer cannot be expected to master. It is to fill this gap that the present publication has been prepared. In the form of 35 data sheets, it provides concise information on the physical and psychological aspects of noise; noise measuring techniques; sources of noise in vehicles; propagation of noise in vehicles; noise abatement theories; acoustic insulation; practical measures taken in railway vehicles, road vehicles and ships. The bibliography, covering 76 items, is confined to German language publications.

The Harvey Team. A 16-page brochure, published by G. A. Harvey & Co. (London) Ltd., Woolwich Road, London, S.E.7. This publication serves two purposes. It describes the activities, products, and personnel of this large

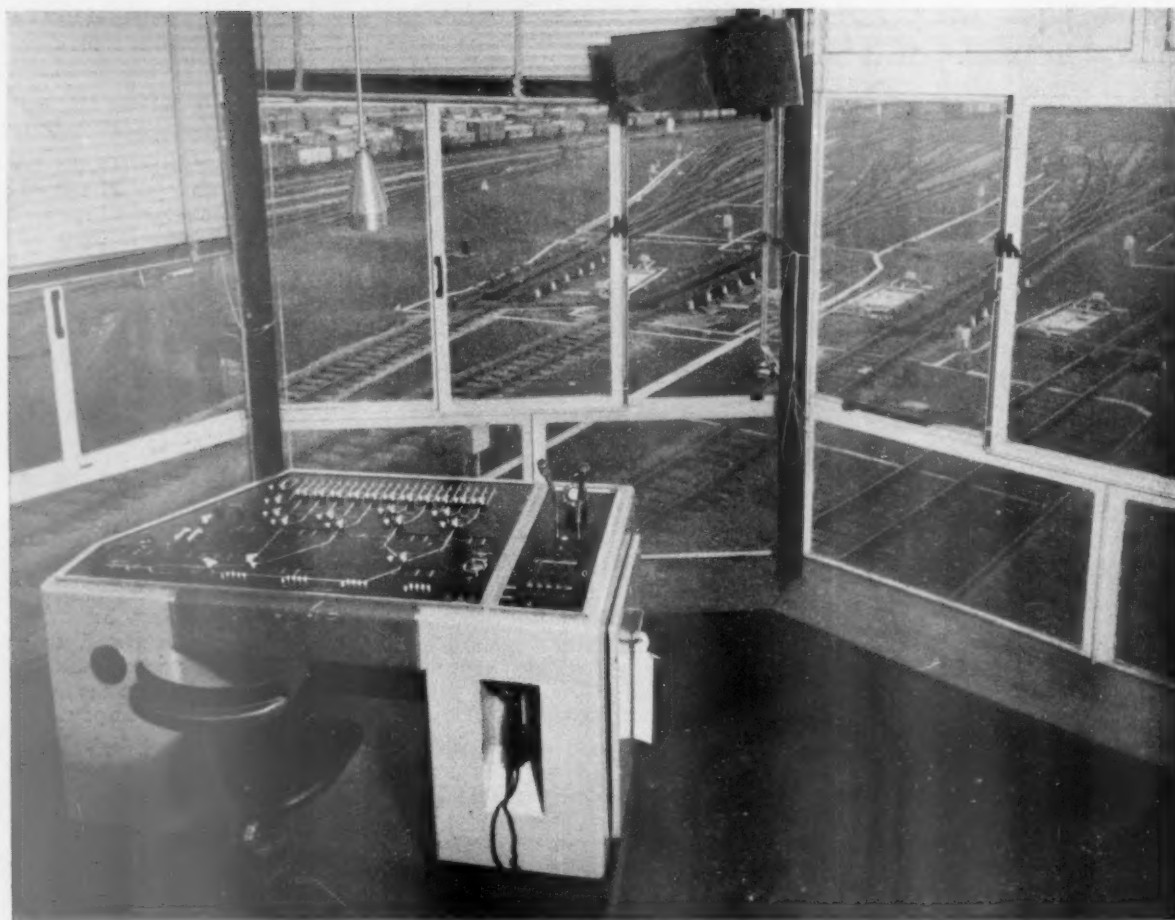
concern, with its numerous ramifications and great variety of specialised products. Also it shows the great advances made in the course of nine decades, for in 1874 the staff consisted of but one boy. Today the work handled varies from steel furniture to very large fabricated components, and from galvanising to metal spinings up to 10 ft. in dia. and 1½ in. in thickness. Importance is placed by the company upon development, research, education, and training, and apprenticeship may be entered into in one of 11 skilled trades.

Automatic & Fluid Transmissions. By J. G. Giles, Odhams Press Limited, Long Acre, London. 9 in. x 6 in. 328 pp. 217 illustrations. Price 45s. This book provides an authoritative work covering principles and practical aspects of design, installation, and operation. Basic transmission is considered under the headings of geared transmissions, hydraulic drives, and electric transmissions, together with miscellaneous mechanical drives. Design requirements of automatic transmissions are reviewed in some detail and are treated practically and theoretically. Mechanical gear-boxes, hydraulic control systems, semi-automatic transmissions, and hydrokinetic fluid drives form the subjects of chapters which cover the ground admirably. While the main emphasis is on low-

power transmissions, heavy transmissions also receive notice. A chapter is devoted to automatic transmissions for heavy-transport duty, which contains a section on locomotive transmissions. The book concludes with a review of possible developments. There are numerous excellent illustrations.

The Amstel Club. This booklet, issued by the United Dominions Trust, the club's U.K. representative, lists the member institutions and describes the specialised facilities for providing credit finance to exporters and importers of capital equipment and durable consumer goods. Copies are obtainable on request to U.D.T.'s Publicity Department, 51 Eastcheap, London, E.C.3.

Diesel-Electric Shunting Locomotive, 2nd edition. By Thomas H. Terry, Shrewsbury, Wilding & Son, Limited, 8½ in. x 5½ in. 88 pp. Illustrated. Paper covers. Price 8s. post free. This book explains, in easily understood form, the 350-h.p. diesel-electric shunting locomotive, but much of the material is applicable to all diesel-electric locomotives. The text is well supported by numerous line drawings and the whole forms a book of much value to the many working this type of locomotive. Compared with the first edition the chief difference is in that section relating to the method of engine starting.



Control desk in the Temple Mills control tower

SIGNALLING AND TELECOMMUNICATIONS in the Eastern Region

WHEN the modernisation plan was announced in 1955 the Eastern Region of British Railways had adequate technical signalling and telecommunications staff for the output of planning and engineering required under normal conditions, but not to meet the needs outlined in the White Paper.

Staff augmented

Immediate steps had to be taken to augment the staff and, by dilution, to increase the number of sub-sections within the organisation to deal with the new signalling and telecommunications projects associated with the proposals for electrification, reconstruction of stations and yards, and the remodelling of workshops and of maintenance and servicing depots.

When the plan was announced, the

Eastern Region already had several major signalling projects in hand, the most important of which was connected with the Liverpool Street-Shenfield electric services, introduced in 1949, which were planned to be extended to Chelmsford and Southend (Victoria). These sections of line had been equipped with colour-light signalling some years previously, but extensive signalling alterations together with cabling of the overhead line

Modernisation schemes with particular reference to the problems posed by introduction of a. c. traction

*by R. A. GREEN, M.B.E., E.R.D., A.M.I.E.E., Chief
Signal & Telecommunications Engineer, Eastern Region*

route were necessary to adapt the system to electric traction conditions.

Standard of 50 cycles

After the announcement had been made that alternating current at the industrial frequency of 50 cycles per sec. would become a standard for British Railways electrification, the Eastern Region designed and executed a series of tests to establish the effect of an

alternating current traction system on signalling and telecommunications equipment. These tests had two main objects: to prove the efficacy of track circuits specially designed to work in a.c. traction areas, and to assess the value of the voltages which would be induced in lineside cabling—both signalling and telecommunications—from the traction currents flowing in the overhead system, in the earth, and in the return rails.

First tests

The first series of tests was carried out on a section of line already electrified at 1,500-V. d.c. from Fenchurch Street to Bow Junction and, in accordance with a carefully-designed programme, complete possession of the line was obtained. The 1,500-V. d.c. traction feeders were replaced temporarily by connections to an a.c. source which fed power at 50 cycles to the overhead equipment. At the remote end of the section the overhead equipment was connected to the return rail and the voltage built up by degrees to give currents of varying magnitude.

During the periods in which these "steady currents" were flowing, measurements were made of the voltages induced in cables of different types carried on a route alongside the running lines. Experimental track circuits developed by three principal signalling contractors were brought in use temporarily and observations and measurements were made to check the efficiency of their operation. The principal cable manufacturers also co-operated in these tests. Later, a similar series of tests was carried out under comparable conditions between Shenfield and Ingatestone, to determine the degree of induced voltages produced in the lead-sheath telecommunications cables.

Analyses of tests

The analyses made of the results of these tests were subsequently used in finalising the design of the signalling equipment and in determining the permissible length of track circuits and of unbroken line circuits paralleling the overhead equipment. The accuracy of the information obtained has since been proved by tests taken on lines now working with an a.c. traction system.

After the decision had been taken to electrify the Liverpool Street-Enfield Town-Chingford-Hertford (East) and Bishops Stortford lines (to be known as the "Chenford" scheme), arrangements were put in hand as a matter of urgency to carry out a pilot scheme of 25-kV. traction on the line between Colchester and Clacton-on-Sea—including the Walton-on-Naze single branch line. Planning commenced at the beginning of 1956 and a public service was introduced—the first in the country using 25-kV. traction—early in 1959.

To give required line capacity under

electrified conditions, complete re-signalling of the lines was undertaken, reducing the number of signalboxes from 13 to 8. The existing aerial line route and semaphore signalling between Colchester and Clacton were replaced by cabling and colour-light signalling and track-circuiting throughout. Special d.c. track circuits immunised against the effects of a.c. were used in this case. When this line became operational more tests took place to obtain information regarding the operation of signalling equipment working at 83½ cycles per sec., a scheme using this type of equipment being already in hand.

The development of the "Chenford" electrification scheme involved the introduction of colour-light signalling from Bury Street Junction to Hertford and Bishops Stortford (via the Southbury Line) and the modification of the existing system on the Enfield and Chingford lines to make it suitable for use with a.c. traction. Careful regard was paid to economics by the adoption of hybrid installations where panels were not justified and by the provision of a large number of ground frames to operate points which were to be relatively seldom in use.

"Hybrid" working

"Hybrid" working was introduced at three signalboxes; and one new fully-mechanical box was constructed at Ware and three panel installations were commissioned at Hackney Downs, Harlow Mill, and Broxbourne. The panels operate on the entrance-exit principle and, in two cases—at Hackney Downs and Harlow Mill—control remotely-situated interlockings by the Westronic time-division scanning system. In this fully-transistorised system more than 100 controlling instructions can be sent out and the same number, or more, indications received back from the remote interlocking—all over one pair of wires. The scanning time cycle occupies 1.2 sec.

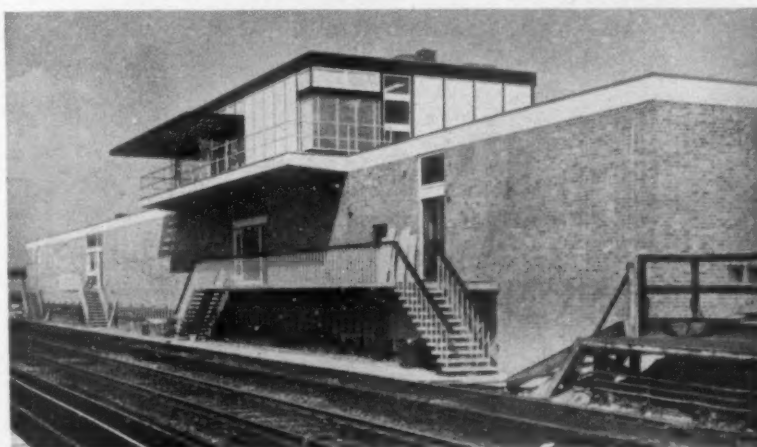
in which time 120 channels are dealt with.

At Ware, the new mechanical signalbox replaced a former signalbox at one end of the station and a level crossing with a gatekeeper's hut at the other. During the course of the electrification work, the local authorities decided to widen the roadway and it was decided to introduce lifting barriers controlled from the new signalbox. The barriers, four in number, are worked by independent electric motors controlled from two pushbuttons mounted on a pedestal in the signalbox.

The electrification of the gap between the electric lines from Liverpool Street to Chelmsford and from Colchester to Clacton is well in hand and should be operational next year. In this scheme a large new relay interlocking is to be built at Colchester and a smaller one at Witham. The existing signalbox at Marks Tey will have the frame reduced in size and a panel for control of signals added.

Signalling of L.T.S. electrified lines

The scheme for signalling the lines now being electrified between Fenchurch Street in East London and Tilbury, Southend Central, and Shoeburyness is the largest re-signalling project ever undertaken by the Eastern Region. The work, at present about 70 per cent complete, and in service, has involved a complete replacement of the old semaphore signalling by modern equipment. New power signalboxes with panels similar to that at Hackney Downs have been brought in use at Southend Central and Pitsea and hybrid installations are operating already at nine other places. At Barking a large new signalbox has been constructed which contains two independent signalling installations; the London Transport equipment being housed in a separate part of the building. The panel for the Eastern Region signalling operates on the entrance-exit principle, a turn switch being used at the entrance to a route and a push-button at the exit. The slope of the control desk, in common with



Master signalbox at Barking

modern practice, is nearer the horizontal than in previous installations of this type.

A large relay interlocking at Tilbury Riverside and three "hybrid" installations have yet to be completed.

The remote interlockings at Gas Factory Junction and Stepney, which have recently been introduced, will be controlled from a panel in the existing signalbox at Fenchurch Street over a system using 11-voice frequency circuits on one cable pair.

All the equipment from Fenchurch Street to a point on the country side of Upminster will be working under both a.c. and d.c. traction conditions—the London Transport lines parallel the London, Tilbury & Southend line from just beyond Gas Factory Junction to Upminster. Current at 83½ cycles per sec. has therefore been adopted for the signalling supply. This 83½ cycles per sec. supply, and also that on the Liverpool Street-Chelmsford-Southend (Victoria) lines, is obtained from specially constructed generators driven from a 50-cycles per sec. supply by auto-synchronous motors.

Track circuit indication

On the automatic sections from Gas Factory Junction to Upminster, a novel system of track circuit indication has been introduced. Only one pair of wires is used for each running line and each track circuit is allocated a frequency in the voice range. The stability of the frequency at the transmitting end is controlled by a vibrating reed which fails to respond if the oscillator drifts by more than a very small amount from the established frequency.

This system is of advantage where, as in the case under review, a large number of indications are involved. To limit the induced a.c. voltages emanating from the

traction system, the line-circuits require to be cut at intervals—varying from 1½ to 5 miles—according to the traction power distribution arrangements.

With the reed-controlled frequency system it is only necessary to insert a transformer in the cable pair where required, thus saving the large amount of equipment which would be necessary if independent d.c. indication circuits had been provided.

Conversion from d.c.

At the time the "Chenford" scheme was conceived, the Liverpool Street to Chelmsford and Southend routes were operating with 1,500-V. d.c. traction and it was decided to convert these lines, about 150 track-miles, to a.c. traction. This decision meant the abandonment of the 50 cycles per sec. signalling equipment and, because the signalling could not be converted overnight, a system had to be devised which could be introduced without interference with traffic and which would operate satisfactorily with both d.c. and a.c. traction.

All equipment which could in any way be affected by the traction-return currents, i.e., essentially track circuits and point-detection circuits, was converted to operate at 83½ cycles per sec. Most of the line circuits were changed to d.c. working, being limited in length as required to confine the induced voltages within the prescribed limits under both normal running and traction fault conditions.

Almost all apparatus had been dealt with before a selected week-end on which the changeover was scheduled to take place. It was only necessary to change the connections to some of the point control relays during the period between the cessation of d.c. traction and the switching-on of the new system layout.

In anticipation of further electrification, planning for complete re-signalling of the Great Northern main line and the Hertford Loop is proceeding. This will present special signalling and telecommunications problems.

A scheme is under preliminary examination for an extension of the Liverpool Street-Bishops Stortford electrification to Cambridge.

Concurrently with this work it is possible that the Lea Valley Line from Stratford via Tottenham to Cheshunt would also be electrified. If these projects come to fruition, major items of signalling work would be the construction of large relay interlockings at Tottenham and at Cambridge. At the latter place the new power installation would control the area from Trumpington to Coldham Lane, thus displacing the two "slide-lever" power frames at Cambridge North and South which have been in service since the 1920's.

Telecommunications

Because the high-voltage traction system uses booster transformers and return conductors, it has been necessary to give careful thought on the question of the most suitable type of cable to be used for telecommunications circuits. It was decided to use air-spaced paper-insulated cores enclosed in an aluminium sheath earthed at intervals of 1,000 yd. and consequently carrying a current produced by the difference in potential at the earthing points. This sheath current produces a magnetic field which in great measure neutralises the field produced by the currents in the traction system and thus considerably reduces the voltage which would otherwise be induced in the cable cores.

During the course of the re-cabling on the electrified lines provision is made for a future improved automatic telephone network which will eventually enable all parts of the Region to communicate by direct dialling. The rationalisation of the communications network will demand the provision of more trunk telephone and telegraph services and plans for multi-channel carrier telephone systems and voice-frequency telegraph networks have been worked out ready for manufacture and installation to commence at the appropriate time.

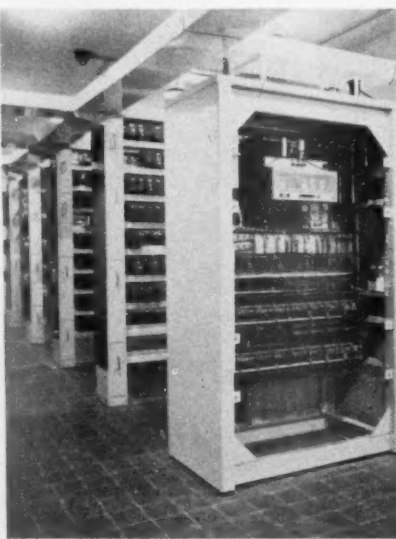
New office communications

The reorganisation of the Traffic Departments has called for alterations in office telephone facilities and the installation of a centralised dictating system.

Train control telephone systems have been modernised and the increased services on the electrified lines, together with the abolition of many intermediate signal-boxes, have demanded additional train describing apparatus. In this field developments have taken place since the earlier systems in which the displays



Front of Westronic cubicle at Harlow Mill relay room



Rear of Westronic cubicle in the same relay room

were always given by means of stencils illuminated from the rear. Projection systems and the use of cathode ray tubes have enabled very considerable reductions to be made in the size of the display units, thus not only reducing the amount of equipment, but also making it easier for signalmen to interpret the indications. In the London, Tilbury & Southend electrification scheme a comprehensive train describer system is in course of installation and pre-recorded train announcing will shortly be installed at Barking.

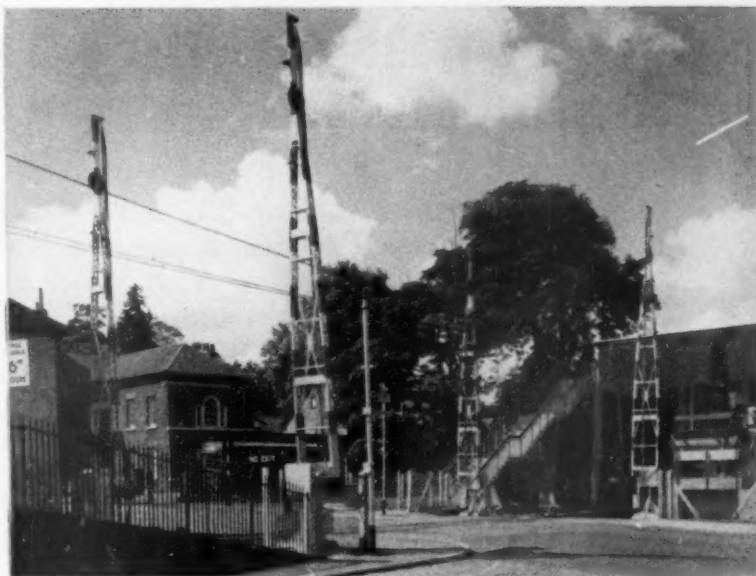
A centralised exchange is to be provided at Kings Cross which will replace in modern form several life-expired installations.

The new standard Automatic Warning System is being installed as quickly as circumstances permit. After the satisfactory completion of the extensive trials on the Up and Down main lines from Kings Cross to Grantham, A.W.S. was installed on all the Great Northern main lines through to Doncaster. The approved system is being installed on recently-electrified sections and projects are in hand to extend the system to other important lines in the Region.

Marshalling yards

At the time the modernisation plan was launched work had already commenced on the construction of a large hump marshalling yard at Temple Mills to replace the existing installation and to enable several smaller yards in the London area to be closed; this scheme involved the building and equipping of two new signalboxes—Temple Mills East and Temple Mills West—each housing a complete panel-operated relay interlocking system. The yard is now operational.

Two primary and eight secondary retarders of the conventional air-operated type are used but only the secondary retarders are manually controlled. A radar scanning system is used to measure the acceleration of the wagons as they leave the hump and this information, together with an assessment of the weight, provides material for a computer which calculates the pressure to be applied to the primary retarders in order to adjust the speed so that each cut approaches the secondary retarders under the same conditions. The operator in the control tower then assesses the amount of available space in the siding to which the cut is being directed and applies the appropriate amount of additional braking by means of the secondary retarder to cause



Lifting barriers at Ware

the cut to close up behind the wagons already in the siding.

A new hump marshalling yard at Barking, Ripple Lane, which handles a large proportion of the freight to and from south-east Essex, has recently been brought into use. This yard has both primary and secondary retarders with full automation. Track circuits in the classification sidings give an indication of siding fullness and this information, together with that obtained from wheel counters, actuates the computers which regulate the amount of braking to be applied by the secondary retarders. The conventional relay storage and progression circuits used for automatic setting of the siding points have been replaced by a completely transistorised static switching system. This is the first time such a system of point setting has been used.

Preliminary work has begun on the site for the construction of a large hump marshalling yard at Tinsley, near Sheffield. This scheme will involve the construction of two new signalboxes and the yard will be of the most modern fully-automatic type.

Conclusion

Work proceeds on a number of other important signalling projects. The Peterborough reconstruction proposals envisage one power-operated installation concentrating the work of eight main-line signalboxes between Fletton and Wer-

rington Junctions inclusive. A smaller amalgamation is planned for Peterborough East. Re-signalling is planned for Grantham and at Retford where a scheme has been prepared for substituting the Sheffield-Grimsby line rail level crossing by a dive-under facility.

Specialised equipment

Development of specialised equipment has proceeded as fast as circumstances will permit. A notable instance is the design and production of a transistorised equipment for detecting faults on track circuits on lines where concrete sleepers are in use. The operator wears headphones to which are connected a search coil; this search coil is carried in the hand and a distinctive audible indication is given to the operator when the unit is passing a point in the vicinity of which an earth leak is occurring due to faulty insulating material in the permanent way.

Planning an electrification scheme embraces a large number of factors, including maintenance depots, platform lengthenings, track alterations, and carriage servicing facilities. All these "incidentals" affect signalling and telecommunications work. Additionally, the fact that the traction is to be a.c.—with all its attendant and frequently untried problems—has meant an enormous amount of work for the office staff of the Chief Signal & Telecommunications Engineer.

DIESEL-ELECTRICS FOR NEW ZEALAND

The first six of 18 Model G12 diesel-electric locomotives of an order placed by the New Zealand Government Rail-

ways with General Motors Diesel Limited, were scheduled to arrive in New Zealand on July 15. The remaining 12 are nearing completion in London, Ontario, where a special 3-ft. 6-in. gauge track has been installed by the manufacturer

as part of an extensive final testing. These engines embody improvements upon the 15 supplied to New Zealand by the same builder in 1955-56. The last engine against the present order is expected to be delivered in September.

TWO-POWER LOCOMOTIVES for British Railways

Electro-diesel combination for special services on the Southern Region

FROM an order placed in 1958, six dual-power Bo-Bo electro-diesel locomotives are in an advanced stage of construction at the Doncaster works of British Railways. This principle of combining straight-electric with diesel-electric propulsion is not new; but the novelty here is that for the first time true line-service is to be undertaken by two-power units. Hitherto, dual-power and triple-power (electric-battery-diesel) units have been used only for shunting.

Possibilities

Intended for the Southern Region, these six 73-ton locomotives can be operated as straight-electric locomotives of 1,600 h.p. one-hour output on 600-V. d.c. lines, or they can be operated as normal diesel-electric locomotives of 600 b.h.p., in each case working solo; or they can be coupled in multiple with a standard electric locomotive or multiple-unit electric train on the low-tension d.c. system, or in multiple-unit as a diesel plant with diesel-electric locomotives to give double-heading.

The driving position closely follows the layout of that of the Type 3 diesel-electric locomotives, but two main power handles are required on the master controller, one for diesel operation and the other for electric operation.

Changeover procedure

Each of these has in addition to its normal "off" position a "lock-off" position from which it can only be released by pressing a button at the end of the handle; the locking is such that only one of these two handles can be away from the lock-off position at one time. The changeover from one form of power to the other is then made quite simply by returning one handle to the lock-off position and releasing the other from it.

Starting the diesel engine

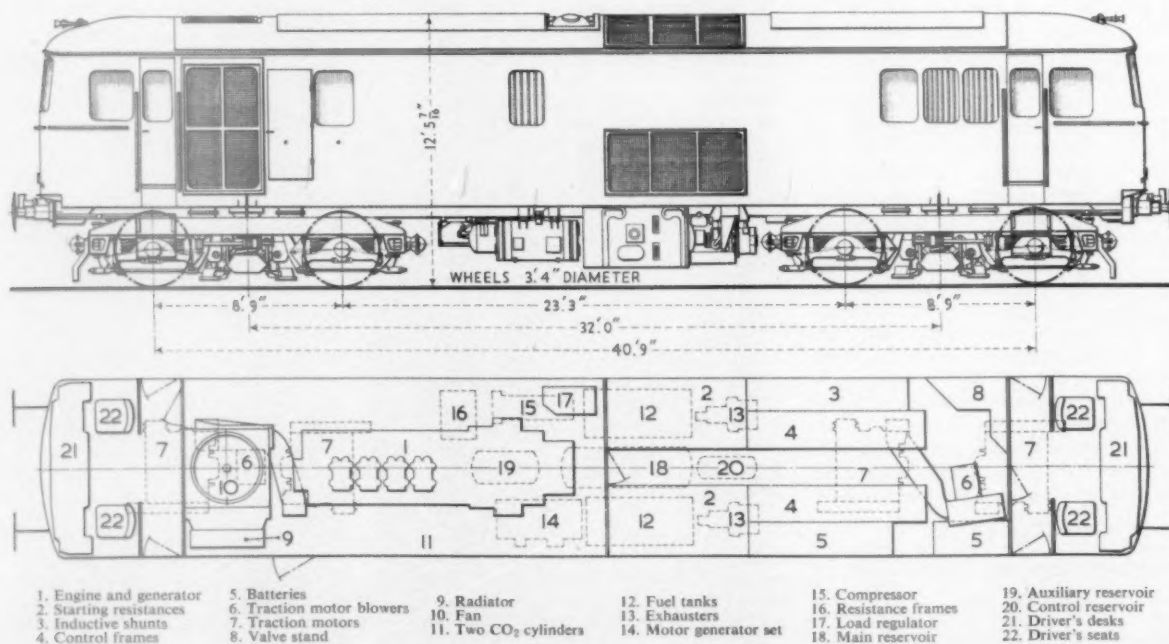
The diesel engine may be started at any time, and would normally be running in readiness for a changeover to diesel power. When the locomotive is running on diesel power the collector shoes are automatically retracted within the loading

gauge; there is a button by means of which the driver can lower the shoes when over a conductor rail to check whether it is alive or not.

All auxiliaries except traction-motor blowers are fed at 110V. This supply is derived from a motor-generator set when line feed is available, and from the auxiliary generator of the diesel group when it is not. The battery is charged from whichever source is available. The two traction-motor blowers are connected in series across the line on electric power, and in parallel across the main generator when on diesel power. Provision is made for taking a supply of current from the 600V. d.c. conductor rail for train heating; but on diesel power the generator is not expected to provide electric train-heating energy, though a certain amount of pre-heating current can be provided.

Braking equipment

Braking equipment is comprehensive in that, when working in multiple-unit with multiple-unit electric trains, it is necessary to be able to control the electro-pneumatic brake of those trains, as well as giving normal straight-air brake control for the locomotive and having vacuum equipment for normal passenger and freight stock.



General arrangement of British Railways Bo-Bo 73-ton, 1,600-600-h.p. electro-diesel locomotive

OIL FUEL COMBUSTION HEATERS on British Railways

Two oil fuel combustion heaters, designed to meet the heating requirements of diesel railcars on British Railways, have completed extended service testing. These heaters, developed and produced by Lucas Gas Turbine Equipment Limited and by Dragonair Limited, both have a rated output of 80,000 B.t.u./hr. and are of similar overall dimensions and weight. In each unit, heat is generated by the combustion of diesel fuel-oil in a stream of air; this heat is transferred by a heat exchanger to a clean ventilating air stream.

The performance characteristics of the Lucas heater, when operating on the normal 24V. d.c. supply, are:—

Maximum heat output	100,000 B.t.u./hr.
Rated	80,000 B.t.u./hr.
Ventilating air flow	650 c.f.m.
temperature rise	110 deg.F.
Fuel consumption	0.69 g.p.h.
Power consumption	500 watts

Separate fans and inlet ducts are used for the combustion air and ventilating air streams; the two streams are kept entirely separate throughout the length of the heater.

Fuel is lifted, via a filter, from the tank by a combined fuel-and-air pump, delivering to the sprayer of the air/oil atomiser. This rotary piston pump, driven through reduction gearing by the electric motor, also provides an air blast to atomise the low-pressure fuel. The fuel is injected downstream into the unit and ignited by a high-tension igniter plug integral with the sprayer.

Heat exchanger

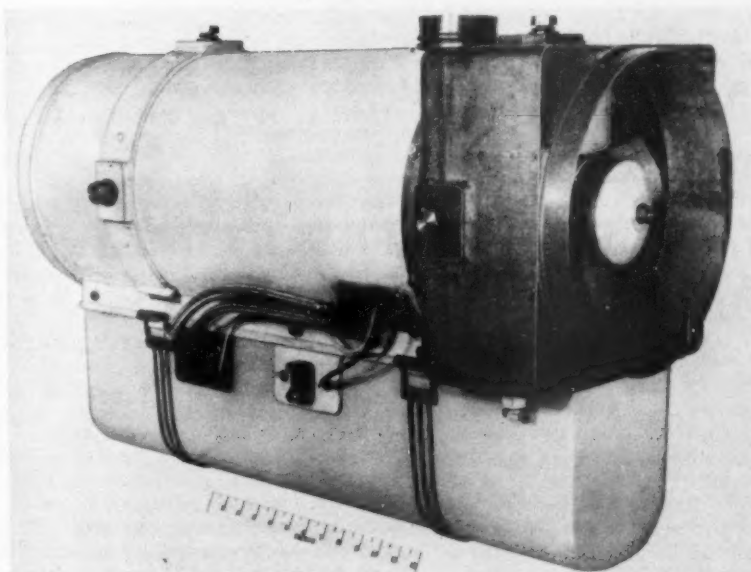
The heat exchanger is made up of four concentric cylinders. An inner stainless-steel cylinder forms the combustion chamber, and the outermost steel cylinder forms the air casing. The two intermediate cylinders form the reverse flow gas annulus.

These cylinders are corrugated to give a compact heat exchanger assembly of high thermal efficiency. As a protection against any leakage of toxic gases into the fresh-air stream, the air chamber is pressurised to a higher pressure than the combustion chamber.

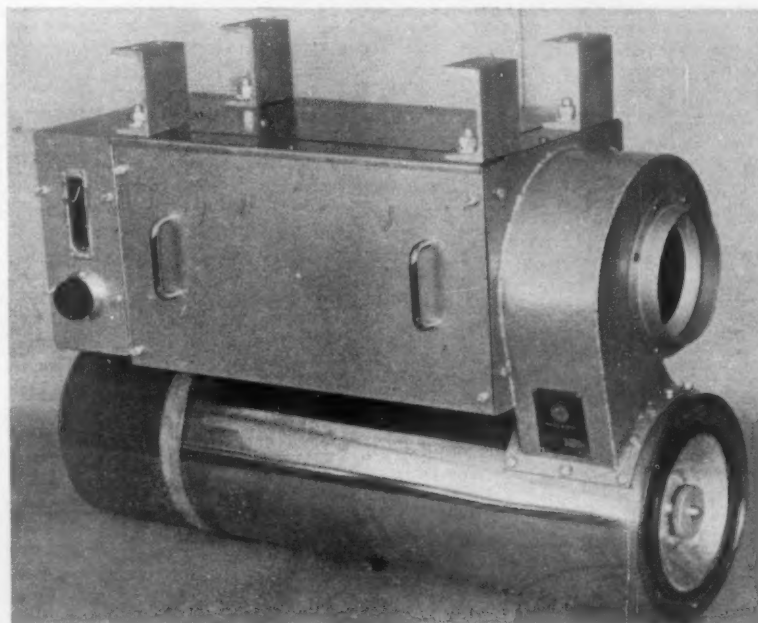
The ventilating fan, combustion air fan, and the pump are driven by a C.A.V. $\frac{1}{4}$ -h.p. 24-V. motor running at 2,850 r.p.m.

A thermostat switch in the coach limits the air temperature to 70 deg. F. by cutting off the fuel supply to the burner if this temperature is exceeded. Safety devices on the heater provide protection in the event of flame failure or excessive temperature. Sensing of flame light-up

Two heat-exchanger type combustion heaters in use on British Railways



Diesel railcar heating equipment with separate combustion and ventilating air streams supplied by Lucas Gas Turbine Equipment Limited



Dragonair heating equipment for diesel railcars with fuel flow metering orifice

and flame-out is by a light-sensitive cell mounted adjacent to the sprayer. A valve is fitted to allow the proportion of recirculating and fresh air to be adjusted. Starting-up and shutting-down of the heater is by operation of a control panel in the driver or guard's compartment. Overall dimensions of the unit are length 33 in., width 13½ in., and height 21½ in. The weight is 190 lb.

Performance characteristics

The performance characteristics of the Dragonair heater are as follow:—

Maximum heat output	100,000 B.t.u./hr.
Rated	80,000 B.t.u./hr.
Ventilating air flow	600 c.f.m.
Temperature rise	120 deg.F.
Fuel consumption	0.65 g.p.h.

The overall dimensions are: length 33½ in., width 13½ in., height 26½ in. (over

mounting brackets), and the weight 200 lb.

The air delivery fan is driven by a 28-V. d.c. ¼-h.p. electric motor running at 2,800 r.p.m. To reduce fan noise the centrifugal-type fan incorporates a forward-curved multi-vane impeller. Fuel ignition is by high-voltage spark from a booster coil, and the fuel system is complete with pump, fuel filter, and solenoid valve.

Integral with the pump is a metering orifice which varies the fuel flow to the burner at different pump speeds. As both pump and fan impeller are directly driven from the motor, the air/fuel ratio for good combustion is maintained, within the required range, for varying motor speeds when operating between 20V. and 31V. d.c. Both the burner and

the heat exchanger are made in heat-resisting stainless steel.

Automatic operation

The auto control system incorporates switching to provide "heat-off-vent." When switched to "vent" the fan only operates and unheated fresh air is supplied through the ducting. When the "heat" position is selected fuel is supplied to the heater, this ignites and warm air is supplied immediately. The saloon temperature is then controlled by the thermostat. Should overheat or flame failure conditions occur the heater is automatically switched off and the appropriate warning light shows on the control panel. Re-lighting is automatic when normal temperature conditions are restored.

TAPE RECORDERS IN MARSHALLING YARDS on the Eastern Region

ONE of the most difficult problems in the handling of freight traffic is the collection of detailed information about individual wagons making up express freight trains. To overcome this the Eastern Region is using miniature tape recorders in marshalling yards on the Great Eastern Line.

Tape recorder details

The man in charge of making up the train in the marshalling yard can record full details of each wagon on a "Mohawk" tape recorder as illustrated, measuring 8½ in. x 3½ in. x 1½ in. weighing less than 3 lb. It can be carried over the shoulder or in a pocket. The machine is powered by an 11V Mercury-cell battery which operates the motor, amplifier, and transistors. The cassette-spool is operated at 1½ in. a second and has a running time of 1 hr.

After recording the direction in which he is walking the operator then records the numbers of the locomotive and brake van, the number, identity, and kind of wagon, and the label-date, source, destination, and contents of the wagon. On an average train this can be done in 10 min. The cassette of tape is then placed on to a playback machine and the information is relayed to, and recorded by, an Edison Voicewriter in the Telegraph Office at Liverpool Street. A subsequent transcription is transmitted simultaneously on to a perforated tape feeding into the teleprinter circuits to the Whitemoor marshalling yard—where the train will be dispersed for dispatch throughout the country—and Liverpool

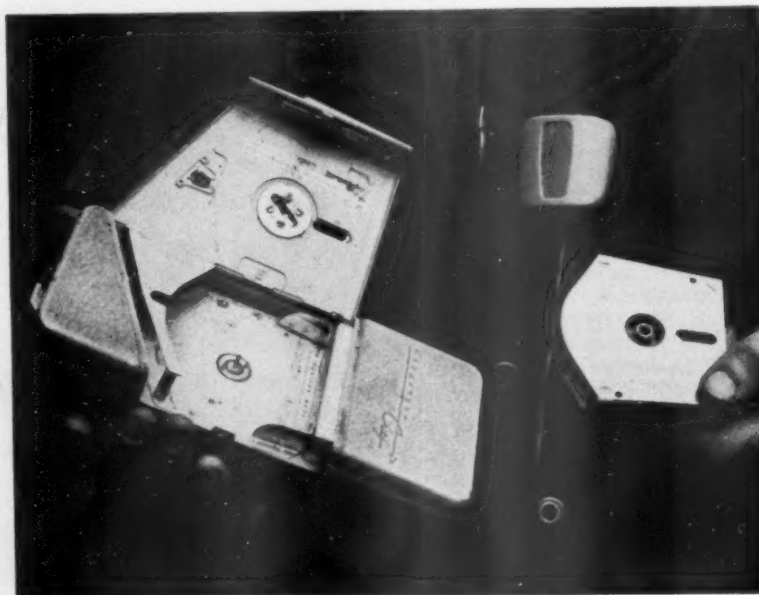
Collection and dissemination of individual wagon information facilitated

Street and Cambridge control offices.

The information has been found to be extremely useful in the advance planning of marshalling-yard work, in current traffic supervision, in the tracing of particular consignments, the testing of transits, and planning of future

freight train services on the line.

Six of the machines are already in use on the Great Eastern Line at Temple Mills and Whitemoor marshalling yards and the extension of the system to record all express freight trains on this line is envisaged.



The "Mohawk Midgetape" tape recorder

ELECTRIC RAILWAY TRACTION SECTION

Swiss traction developments

IN the field of electric traction, Swiss engineers have always been prominent in their technical contributions, and in a recent issue of the *Brown Boveri Review* an account is given of some of the developments which have been introduced in the past few years, and of which we have taken a selection as being particularly worthy of note.

Of special interest in view of the increasing attention given to a.c. electrification at industrial frequency are the designs of traction motors to meet the conditions imposed by rectified a.c. current. To counter the effect of ripple, one of the designs produced is similar in principle to that of a single-phase motor, embodying a completely laminated magnetic circuit. Reduction in pulsation of the field is effected by shunting the excitation winding with a resistor which then carries the majority of the current harmonics. The laminated iron causes the commutating field to follow exactly all changes in current without any time-lag. Motors of this type, in general, are found to need only very small smoothing chokes.

The basis of another design adopted is the normal d.c. motor with a solid yoke and laminated poles. In this case, special smoothing chokes are necessary to reduce the ripple to an acceptable value. Ripple in the excitation field of these machines is minimised by the damping effect of eddy currents produced in the solid yoke with every change of field. The eddy current effect on the commutating field is avoided by arranging the commutating flux to flow through the laminated shunt path. This is achieved by using main pole cores of special shape and by inserting non-magnetic material between the interpoles and the yoke. An interesting example of a rectifier-fed motor is afforded by the installation in some dual-frequency locomotives built for the S.N.C.F. In this application, a single motor is mounted in each bogie, and is connected to the axles by gears and a form of cardan-shaft drive. An unusual feature of the arrangement is that the motor frame forms part of the bogie structure, acting as the main cross-member. Tests with one of these locomotives indicated that an adhesion factor of 50 per cent at 1 km.p.h. was obtainable, a performance which is partly attributable to the effective coupling of the axles through the motor drive.

A recent development in the sphere of motor drives is based on the well-known disc drive. In this design, the two sprung steel plates are replaced by a combination of rubber sectors and segments. A long programme of testing in service has been planned to enable the advantages of this system to be assessed.

Long experience in the high-voltage tap-changer method of a.c. locomotive control has led to the development of a tap-changer for 25-kV. systems. This is in the form of a circular, multi-contact selector switch in which a rotating arm fitted with roller contacts moves over a series of tapping contacts. The external connection to the selector arm is provided by annular rings over which move roller contacts on the arm. The operating mechanism consists of a four-cylinder air motor which drives the selector arm through gearing. Exact positioning of the selector at any desired tapping is achieved by applying equal pressure to two pistons. Cam-operated contactors, associated with the tap-changer, are mounted above it and are actuated by the air motor. The tap-changer equipment has withstood an endurance test consisting of 15 million operations at full voltage without sign of wear, which serves to indicate the reliability of this apparatus.

The problems of pantograph design have been accentuated

by the need to cater for the varying conditions encountered by international traffic. The ideal of a single design of current collector suitable for operating on all the European routes concerned was found to be impracticable, principally because of the wide variations in the length of the pan permitted by the different loading gauge profiles. After a long investigation under the auspices of the O.R.E., it was agreed that the minimum number of designs of pan, which would be practicable for international use, was four, and a pantograph was developed which could be fitted with any of the different kinds of pan, as desired. The suspension system, which incorporates rubber torsion elements, allows flexibility of the pan in the vertical plane and also in the direction of travel. The first example of this design of pantograph has been put into service on a Swiss express motor-coach unit, but its first application for international use is on the Swiss trains of the Trans-Europe Express service.

As a contribution towards the reduction in weight and volume of control equipment, a new form of resistance unit has been developed for starting and braking resistors. The basic resistance element in this design is in the shape of a long, curved vane similar to a turbine blade. The vanes are normally mounted horizontally on edge in a frame with ceramic spacers placed between them at intervals to form a compact grid. The grids are housed one above the other in a container so that cooling air, either natural or forced, flows vertically past the vanes. Plug and socket connections are used so that individual banks of resistor vanes can be drawn out from the housing for inspection and cleaning. Compared with a force-ventilated strip-type resistor of equivalent rating, the vane-type is claimed to show a 40 to 50 per cent saving in weight and a 60 to 80 per cent reduction in volume.

Soviet electric background

TO the present position and planned extensions of railway electrification in the U.S.S.R., as delineated by the present responsible Soviet minister, Mr. B. Beshchev, on pages 106 and 107, there attaches a wide background and a long history, beginning with the simple d.c. conversion of the suburban railways around Baku, Moscow, and Leningrad, seriously overcrowded today and every day over the last 35 to 40 years. Not until the second of the Five-Year Plans did any other kind of conversion come into being, when, in the early 1930's, conversions to 3,000V. d.c. were made in the Goroblagodotskaia area of the Urals and on the Suram pass section in the Caucasus, chiefly to cope with mineral and oil traffic over heavy grades. These early high-tension d.c. conversions brought forth a variety of German-, Italian-, and Soviet-built electric locomotives. Though extensions, of quite considerable mileage according to Western European ideas though infinitesimal in relation to U.S.S.R. railway mileage, were made between 1935 and 1945, it was not until well after the war that large-scale extensions were made on the 3,000-V. d.c. lines, and industrial-frequency single-phase electrification begun. Alternating-current at industrial frequency had attracted Soviet engineers for a long time; there were proposals for it in 1939, and four or five years before that there had been schemes for an a.c. electric transmission system for large diesel locomotives. Today, the high-tension direct-current and industrial-frequency a.c. systems are both in operation on heavy-traffic main lines, with well-defined areas for each. A particular problem has always been the effect of prolonged winter temperatures.



Drivers cab of N-60 electric locomotive

RAILWAY ELECTRIFICATION in the U.S.S.R.

ON THE eve of the 20th C.P.S.U. Congress five years ago, the C.C. C.P.S.U. and the U.S.S.R. Council of Ministers, on N. S. Khrushchev's initiative, adopted a general plan for the electrification of railways. This provided for the electrification of 40,000 km. of railways in 15 years.

Progress is ahead of schedule. Instead of the 8,100 km. envisaged, 8,483 km. of railways have been electrified in five years. Important trunk lines like Moscow-Irkutsk, more than 5,000 km. long, and Moscow - Donbas (Ilovaiskoye), some 1,200 km. long, have been switched to electric traction. Other routes handling important freights, and suburban passenger traffic in a number of big industrial centres also have been electrified. Electric and diesel engine locomotives transported 43 per cent of all freights in 1960, against 14.1 per cent in 1955.

Experience has shown that electric and diesel locomotives have other than technical and economic advantages over steam locomotives. The introduction of new and progressive types of traction

raises to a higher technical level all branches of the railway industry, creates a firm foundation for integrated mechanisation and automation of all production processes in transport, and makes it possible to increase capacity and radically to improve working conditions.

Extensive economies

Electrification and dieselisation saved some 125 million tons of coal and have reduced operational costs by more than 1,700 million new roubles in 1956-60.

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Great progress made under overall electrification plan : further research and help required

by B. BESHCHEV, Minister of Railways, U.S.S.R.

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Growing use is being made of an advanced system of a.c. electric traction with industrial frequency and voltage of 25,000 in the contact wires. At present, 1,400 km. of lines have changed over to alternating current. These include heavy-traffic sections of the Krasnoyarsk and East-Siberian railways. The use of alternating current helps to reduce the volume of building and assembly work and to speed up rates of electrification.

With a.c. it is possible to save an average of 3-4 tons of copper per km. of double-track electrified railway line. A.c. electric locomotives have better traction properties than d.c. electric locomotives. A 12-wheel a.c. electric locomotive can pull a train of the same weight as a 16-wheel d.c. electric locomotive over a difficult part of the line.

A.c. electric locomotives could be made still more efficient if industry, and in particular the Novocherkassk electric locomotive building factory, eliminated certain shortcomings in the electrical and mechanical equipment, and if the U.S.S.R. Lenin Electrical Engineering Institute and the Tallin and Stavropol electrical engineering factories raised the quality and improved the design of mercury rectifiers for these electric locomotives.

Multiple-unit trains

In view of the broad development of a.c. electrification of railways, the rapid production of multiple-unit trains on a.c. for suburban passenger traffic in

such big industrial centres as Gorky, Krasnoyarsk, Rostov, Vladivostok and others has become of great importance. Here the Riga wagon builders and electrical engineering factories manufacturing such rolling-stock can and should be of great help. It also is necessary to organise the production of electric locomotives and motor-wagon sections with semi-conductor rectifiers. We must say that industry is still slow in its preparations for organising the production of these designs.

Automation and remote control

The latest devices of automation and remote control using contactless elements and semi-conductors are being introduced on the electrified railways. These improve the reliability of the functioning of the power supply plants and makes it possible to release considerable personnel engaged in serving the traction sub-stations.

An important task is the further reduction of construction costs in railway electrification. There are considerable reserves for this. Thus, the expenditure of



New electric train ER-6

copper on the overhead wire can be considerably reduced by employing steel-copper trolley wire and steel-aluminium supporting wire. In this way it will be possible to save some 500 tons of copper this year. At present ferro-concrete wire supports are mostly used, which has resulted in a saving of some 70,000 tons of metal in five years. But we can save still more if we accelerate the introduction of mass-produced pre-stressed reinforced concrete supports.

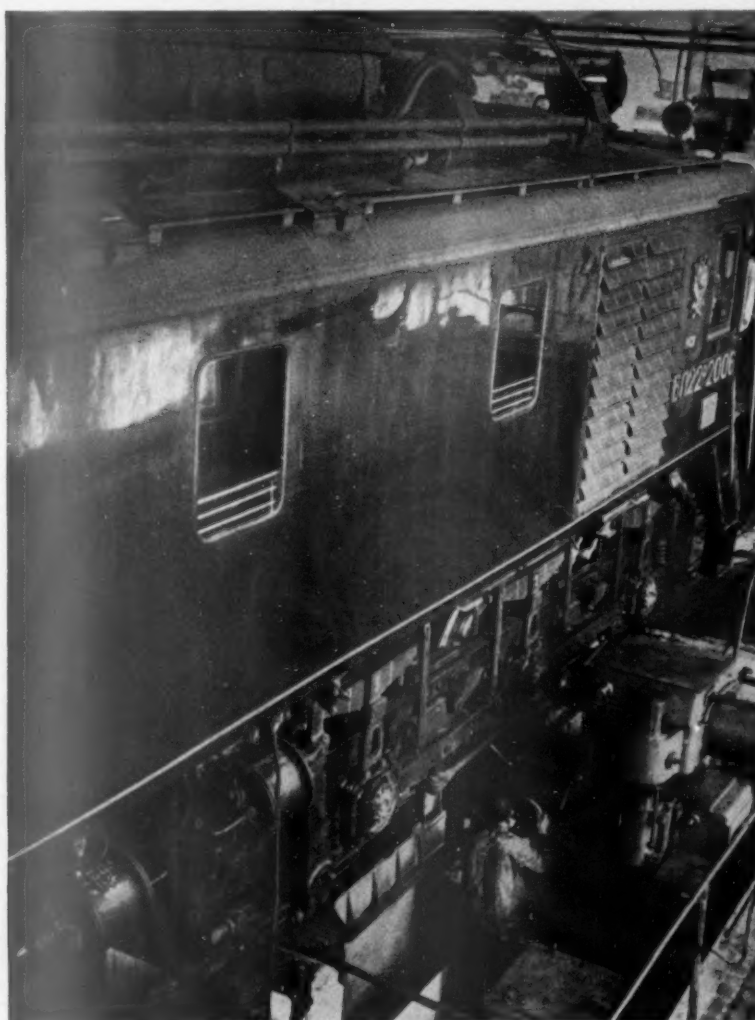
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Every year, Soviet industry is improving the quality of railway rolling-stock, machinery, and other equipment. Serial production has begun of the model N-8, an eight-axle 5,700-h.p. d.c. electric locomotive, the model BL-23, a six-axle 4,300-h.p., d.c. electric locomotive, and of d.c. electric trains. Experimental types of a.c. and d.c. locomotives are being built. Railway workers expect that our industry will accelerate the manufacture of electric locomotives and electric motor coaches embodying latest achievements of science and technology.

The railway workers themselves have a great deal of work to perform. One of their tasks is to improve the condition of railway track and all services to meet the standards of the new locomotives. At present, reconstruction on main lines is carried out on an integrated basis, but in this sphere we need the help of building organisations contracted to erect power transmission lines, re-equip communications systems, extend railway sidings, and instal automatic blocking system.

Effects of electrification

The transfer of the railways to electric traction opens up great possibilities for speeding up the electrification of adjacent agricultural districts. Greater use must be made of these possibilities, bearing in mind that the further development of agriculture, as the January plenary meeting of the central committee of the C.P.S.U. has pointed out, is our general, nation-wide affair.



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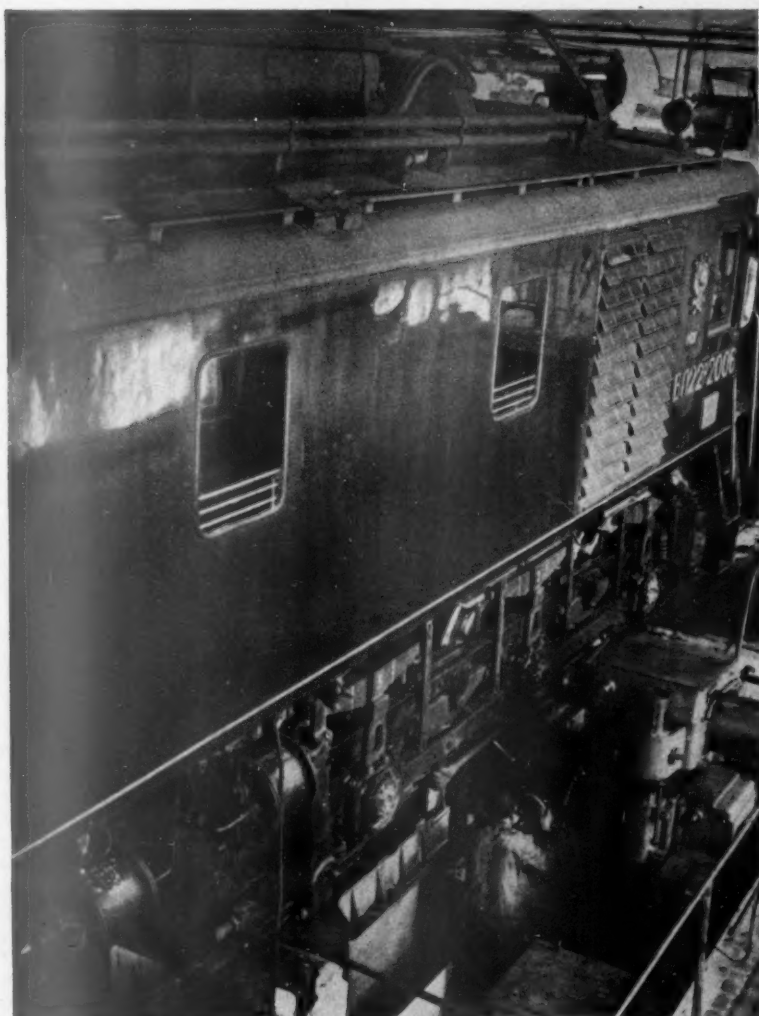
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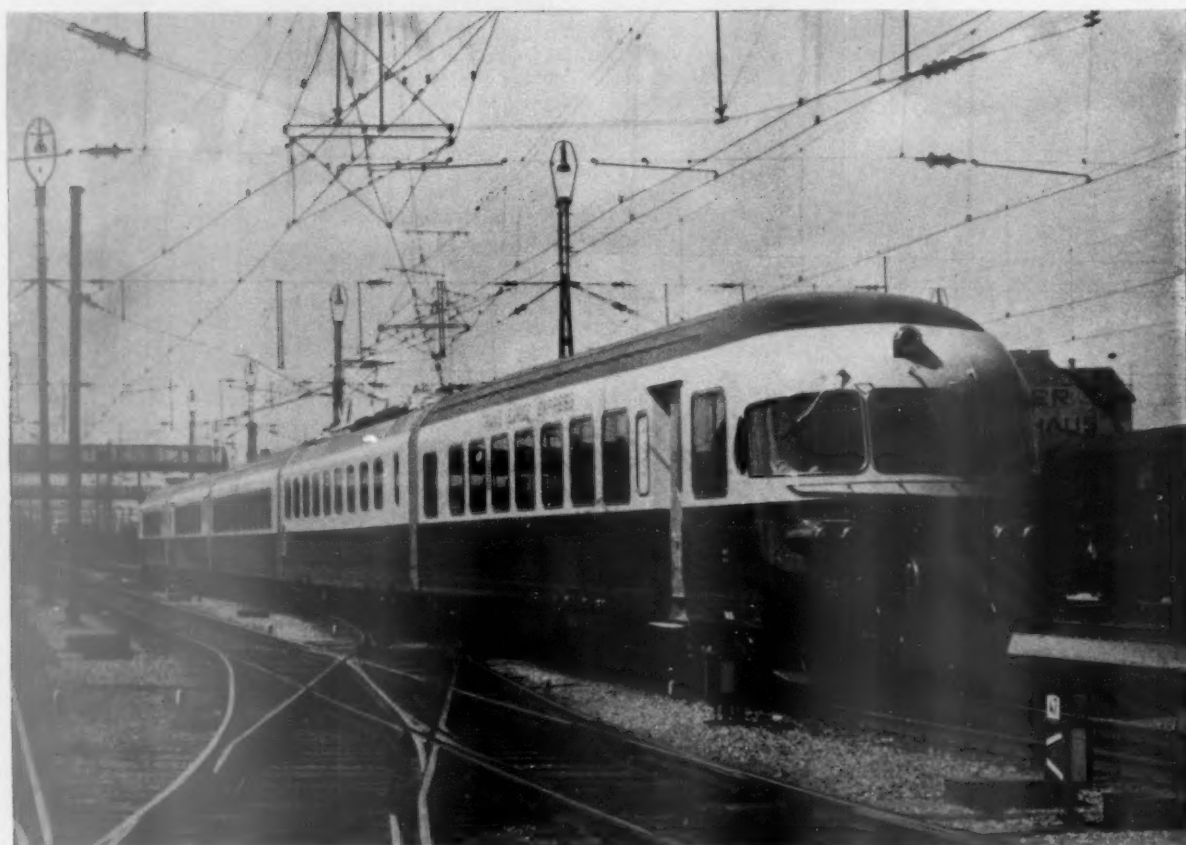
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Special milling lathe for cleaning off electric locomotive chutes



T.E.E. train travelling at speed through a busy junction

ELECTRIC SETS FOR TRANS-EUROPE express trains

FROM July 1, through Trans-Europe Express services have been operated between Zurich and Milan, and between Milan and Paris, with new five-coach electric sets equipped for running on four different systems of electrification. On the Milan-Paris journey, for example, the trains are supplied at 3,000-V. d.c. in Italy; at 15,000-V. 16½ cycles a.c. in Switzerland; and, in France, first at 25,000-V. 50 cycles, then at 1,500-V. d.c., from Vallorbe to Dôle, and Dôle to Paris respectively. This has been made possible by using d.c. traction motors which are fed through silicon rectifiers on the a.c. sections and direct from the overhead line on d.c. sections.

Swiss-manufactured stock

The four trains operating these services were ordered by the Swiss Federal Railways, contracts being placed with the Swiss Industrial Company of Neuhausen and the Oerlikon Company for the mechanical and electrical parts respectively.

Each set consists of a driving trailer at each end, a motor coach with kitchen compartment, a restaurant car, and a centre-corridor coach. All accommodation is first class and a 10 per cent supplement is charged. The two driving trailers serve as observation cars, passengers having a view forward or to the rear through the driving compartments. These two vehicles and the centre-corridor coach provide between them 126 passenger seats. A set measures 410 ft. in length and weighs some 250 tonnes. The four traction motors develop 3,400 h.p., allowing the gradients on the St. Gotthard and Simplon routes to be negotiated at 53 m.p.h., and a speed of 99 m.p.h. to be attained on the level. The installed horsepower is stated to be

Pushbutton selection of circuits for running on two a.c. and two d.c. systems

sufficient for the same performance to be maintained if a sixth vehicle is added to the rake.

Similar to diesel-electric T.E.E. sets

In general, the accommodation is similar to that in the Swiss diesel-electric T.E.E. sets, but the entrance vestibules have been widened and cupboard space has been provided in them for luggage and clothes. Separate toilet compartments are provided for men and women, and there is a ladies' powder room. Removal of the kitchen compartment from the restaurant car to the adjacent motor coach has enabled the seating in the car to be increased, while adding to passengers' comfort by having three seats in the width of the vehicle instead of four.

"The Cisalpin"



*The "Ticino" leaving
St. Gotthard tunnel*



Interior of cab

*The "Gottardo" nearing top of
St. Gotthard Pass at 53 m.p.h.*

The car seats 48 passengers and has a bar compartment at one end with six further seats. All vehicles are air-conditioned with plant supplied by Brown Boveri & Co. Ltd., Baden.

Traction equipment and electrical supplies

The motor-coach houses the traction equipment and the electrical supplies for air-conditioning, lighting, and cooking. It is carried on two three-axle bogies, in which the outer axles are motored and equipped with four pantographs to conform with the standards of the different administrations over whose lines the train runs. The required pantograph is selected by operating one of four push-buttons. When it makes contact with the overhead line a system of voltage-sensitive and frequency-sensitive relays checks that the correct supply is present and then sets up the appropriate traction circuit and auxiliary supply connections. Until these operations are completed the main circuit-breaker cannot be closed. The whole sequence is automatic once the driver has operated the pushbutton.

The traction motors operate at 1,500-V. d.c. On a.c. sections speed is con-

trolled by tap-changing with electro-pneumatic contactors on the low-tension side of the transformer. No change is made in the connection to the primary for the two a.c. voltages, but, when running on 25kV., only 23 of the 27 taps are used. A transition resistor is in circuit on certain steps and the number of continuous-running notches which may be selected by the driver is therefore limited to 12. For d.c. running, normal resistance control is used. The motors are grouped in series and series-parallel on 3,000V., and first in series-parallel, then in full parallel on 1,500V. Each grouping on both d.c. voltages has 13 full-field and four weak-field notches. So far as the driver is concerned, manipulation of the controller is the same on all systems.

Auxiliary circuits

Auxiliary circuits are fed by a three-phase, 50-cycle alternator driven by a twin-armature d.c. motor. On a.c. lines the armatures are connected in parallel and supplied at 1,500V. from semi-conductor rectifiers. On d.c. sections the armatures are in parallel for 1,500V. and in series for 3,000V. A

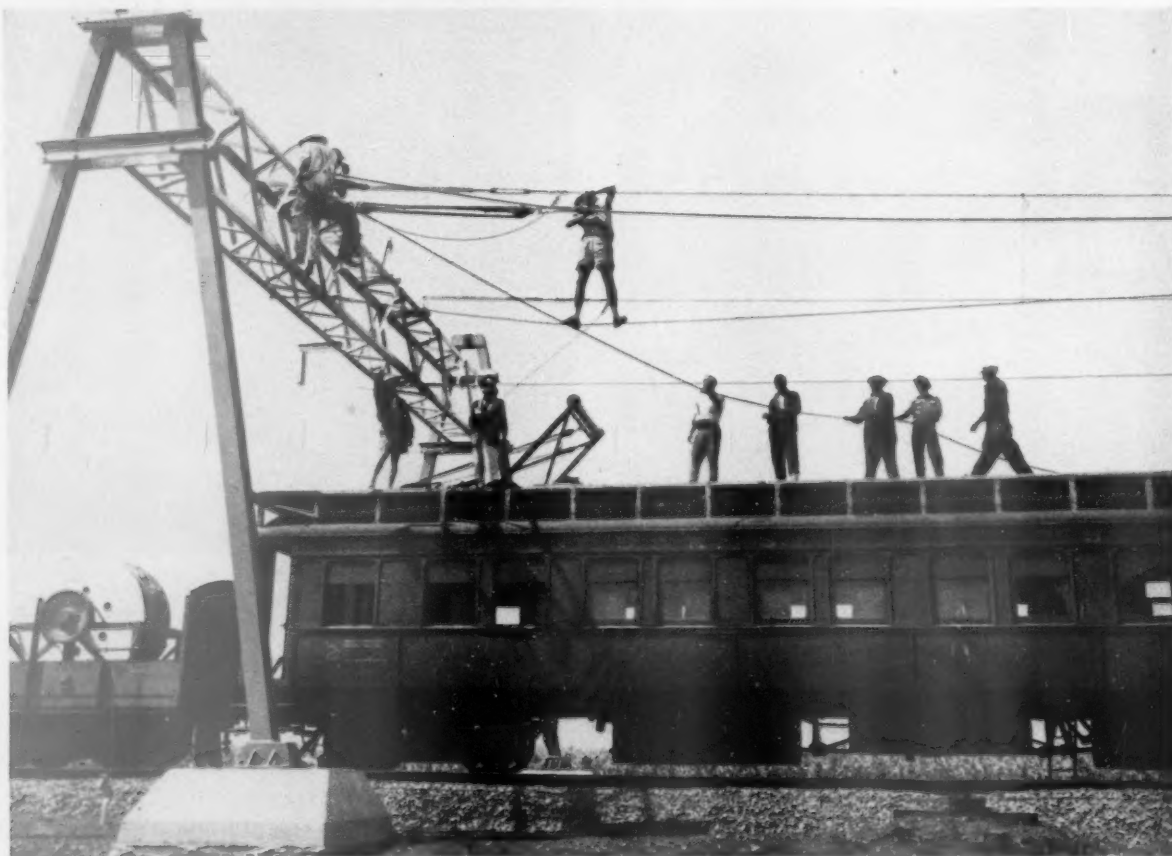
rectified supply from the three-phase auxiliary system is used for battery charging.

Colour scheme

Coaches are panelled in light wood and the seats are in soft shades of green or rose with white stripes. They have adjustable reclining backs. In the restaurant car the walls are covered with a geranium red material and the seating is grey. Metal fittings are in unpolished aluminium. All windows are fitted with venetian blinds, electrically-operated so that they can be raised or lowered at the touch of a button. The exterior finish of the trains is scarlet and cream.

The services operated by the new trains between Zurich and Milan are known as the "Gottardo" and the "Ticino," while the Milan-Paris service is the "Cisalpin." Their schedules were the subject of an editorial note in our June 30 issue. The ability to work on four different systems of current supply would enable the trains to operate the present diesel-electric T.E.E. "Edelweiss" service between Zurich and Amsterdam if necessary, using their d.c. equipment in Belgium (3,000V.) and Holland (1,500V.).

ELECTRIFICATION IN SOUTH AFRICA



Electrification work in progress on Vereeniging-Kroonstad line

PERSONAL

British Transport Commission

SIR JOHN BENSTEAD, Deputy Chairman, British Transport Commission, is to retire on September 30. He has been a full-time member of the Commission since September, 1947, and Deputy Chairman since 1949.

British Railways

MR. G. H. LUCK, Assistant (Salaried Staff) to the Chief Establishment & Staff Officer, British Railways, Southern Region, who has been appointed Assistant Establishment & Staff Officer, started his railway career with the former South Eastern & Chatham



Mr. G. H. Luck

Railway in 1919 in the office of the Port Superintendent at Folkestone Harbour. In 1936, he was transferred to the continental freight terminal at Bricklayers Arms following the introduction of the train ferry service between Dover and Dunkerque. In 1941, he was appointed to the personal staff of the Goods Agent, Bricklayers Arms and in 1943, he was transferred to the Office of the Chief Officer for Labour & Establishment at Waterloo. Mr. Luck became Chief of the Salaried & General Section in 1947, Staff Assistant to the Marine & Docks Manager, Southampton Dock, in 1950, Staff Assistant to the Shipping & Continental Manager, Victoria, in 1956, and Assistant for Salaried Staff matters to the Chief Establishment & Staff Officer, Waterloo, in 1957. He is Chairman of the Marine Sub-Committee of the Railways Staff Conference.

MR. G. R. ROBINSON, B.COM., Assistant Establishment & Staff Officer, British Railways, Southern Region, who is retiring on August 31, entered the service of the former North Eastern Railway in 1915, and



Mr. G. R. Robinson

after station and district office experience was awarded a Traffic Apprenticeship in 1922. In 1925 he obtained an appointment in the staff section in the office of the Chief General Manager of the former London North Eastern Railway Company, where he subsequently became Senior Assistant (Wages Staff). From 1935 to 1950 he was Secretary of the Employer's Side of L.N.E.R. Sectional Councils Nos. 2, 3, 4 and 5. On nationalisation Mr. Robinson transferred to the Eastern Region and in 1951 he was appointed Assistant Establishment & Staff Officer, Southern Region. At one time he was chairman of the Southern Regional Council of the B.R. Staff Association, and from 1954 he acted as Productivity Assistant to the General Manager, Southern Region.

MR. J. F. CARLING, Stationmaster, Ilkley, British Railways, North Eastern Region, has been appointed Passenger & Parcels Agent, Sunderland.

MR. A. L. PANKHURST, Temporary Stationmaster, Morley, British Railways, North Eastern Region, has been appointed Stationmaster, Thorner, also in charge of Bardsey.

MR. D. H. H. REED, Relief Stationmaster, Leeds District, British Railways, North Eastern Region, has been appointed Stationmaster, Scholes.

The London Midland Region of British Railways has announced that the following appointments have been made: MR. W. H. HOLMES to be Principal Assistant to Line Traffic Manager, Crewe; MR. D. S. DAVIES to be Principal Assistant to Line Traffic Manager, Derby; MR. C. M. SYKES to be Principal Assistant to Line Traffic Manager, Manchester; MR. F. R. GUNTON to be Finance Assistant, Line Traffic Manager's Office,

Manchester; MR. D. BEATTIE to be Assistant Divisional Traffic Manager, London (Midland); MR. J. A. K. GRAY to be District Operating Superintendent, Nottingham; MR. M. C. B. JOHNS to be District Engineer, Derby (South); MR. G. ELMITT to be Secretary, L.M.S. Savings Bank, Euston; MR. A. G. FOX to be Assistant to Estate & Rating Surveyor, Euston; MR. J. W. ATKINSON to be Stationmaster, Blackpool (Central).

MR. T. NEAL, Treasurer, British Railways, London Midland Region, who, as recorded in our July 21 issue, has retired, began his railway career on the former L.N.W.R. in the Chief Cashier's office at Euston in 1910. During the 1914-18 war he served in H.M.



Mr. T. Neal

Forces in the Middle East and after demobilisation returned to Euston. After gaining experience in various offices of the Cashier's Department he became Head of the Banking Accounts Section in 1940 and was appointed Head of the General Section in 1943. Following nationalisation and the formation of the Treasurer's Department, he continued in the same position but with increased responsibilities. In December, 1950, Mr. Neal was appointed Assistant Treasurer and in 1956 he was appointed Treasurer.

London Transport Executive

DR. G. C. ACRES, Medical Officer, North East Medical Division, London Transport Executive, who has been appointed an Officer of the Executive, joined London Transport in 1952. He qualified in medicine at St. Bartholomew's Hospital and is a Member of the Royal College of Surgeons, a Licentiate of the Royal College of Physicians, and holds



Dr. G. C. Acres

the Diploma in Industrial Health. Dr. Acres has served with the Royal Army Medical Corps in India and has been Medical Officer at the Ministry of Pensions Hospital at Southampton. He had industrial medical experience in British Guiana before joining London Transport. Dr. Acres has been in charge of the North East Medical Division since 1955.

DR. J. FAIRLEE, Medical Officer, South East Medical Division, London Transport Executive, who has been appointed an Officer of the Executive, joined London Transport in 1951. He qualified in medicine at St. Mary's Hospital and is a Member of the Royal College of Surgeons, a Licentiate of the Royal College of Physicians, and a Fellow of the Pharmaceutical Society. He holds the degree of Bachelor of Pharmacy and the Diploma in Industrial Health. He has been in charge of the South East Medical Division since 1954. Dr. Fairlee has also been House Physician and Senior House Officer, and Medical Officer with a private company.



Dr. J. Fairlee

Industrial

MR. H. C. H. MATTHEWS has been appointed Technical Director, Pantak Limited.

MR. J. M. HOWARD has been appointed a Director of B.E.T. Omnibus Services Limited in place of the late LORD GIFFORD.

DR. W. J. GIBBS, Manager, Engineering Mathematics Department, Associated Electrical Industries (Rugby) Limited, has relinquished that position. He is succeeded by MR. N. KERRUISH.

MR. J. E. GIBB, Establishment Manager, Tempered Spring Co. Ltd., and MR. K. G. SETTLE, Secretary & Accountant, Henry Russell & Co. Ltd., have been appointed Directors of Henry Russell & Co. Ltd.

Obituary



Mr. C. Grasseann

We regret to record the death, on July 23, of MR. C. GASEMANN, who was, until he retired in 1950, Public Relations & Publicity Officer, British Railways, Southern Region. He was the son of the late Mr. C. E. Grasseann, a former Chief Goods Manager of the London & North Western Railway. In January, 1912, he entered the service of the South Eastern & Chatham Railway, and became an Assistant District Superintendent in May, 1914. On the formation of the Southern Railway he was appointed Assistant to the London East Division under Sir Eustace Missenden; and in 1925 was appointed Assistant Divisional Superintendent at Exeter. In March, 1930, Mr. Grasseann was appointed Public Relations & Advertising Officer of the Southern Railway and shortly after taking over the position he formed a Film Division, that produced some notable films which have been translated into other languages. He was eight times Chairman of the Railway Clearing House Public Relations & Advertising Committee previous to nationalisation. On the nationalisation of the British railways he was lent to the Railway Executive to

assist in forming a Public Relations Department, and under the new organisation of 1949 he returned to the Southern Region as its Public Relations & Publicity Officer. Mr. Grasseann was a Freeman of the City of London, a Past Master of the Fruiterers Company, and was on the Court of the Stationers & Newspapermakers Company.

We regret to record the death, on July 13, at the age of 57, of MR. T. C. HALE, Joint Managing Director, Cape Asbestos Co. Ltd.

We regret to record the death, in a motor accident on July 17, of MR. B. MOULTRIE, General Manager, Railway Traction Department, Rolls-Royce Limited.

We regret to record the death, on July 23 at the age of 74, of BRIGADIER L. MANTON, who was, until his retirement in 1951, Principal of British Railways School of Transport, Derby. His military career was connected largely with the training of army personnel at the Railway Training Centre, Royal Engineers, Longmoor. Before the first world war, Brigadier Manton served with the Indian State Railways, on the construction and traffic sides, and in 1914 went to France with the Sappers and Miners. Soon afterwards he was transferred to the transport work on which he was engaged for the rest of the war. He was awarded the D.S.O. in 1917. Brigadier Manton was again engaged in railway work in 1930, when he was appointed to command the Railway Training Centre, R.E., which command he held for four-and-a-half years. In the autumn of 1935 he went to Egypt as Assistant Director of Transportation, and early in 1936 he became Chief Engineer, Malta, vacating this position to become Principal of the London Midland & Scottish Railway School of Transport at Derby in 1937. He became Commandant of No. 2 Railway Training Centre at the outbreak of hostilities in 1939 and Director of Transportation in India in 1941. He returned to his position of Principal, School of Transport, Derby, after the war and retired from that position in 1951.



Brigadier L. Manton

NEW EQUIPMENT *and* Processes



PORTABLE OFFICE

A portable office, known as the Portakabin, is said to provide a temporary office with permanent standards.

Constructed as a single unit it has telescopic legs on which it is raised and lowered by a jack. One man, it is claimed, can remove the unit from a lorry in 15 minutes.

The design permits of nesting units on top of each other if it is required to save space. In a building project the office may be raised from floor to floor as building progresses.

Construction is based on the use of resin-bonded plywood. Doors are split on a stable design. Adjustable louvred windows are provided and these are adaptors for electricity and telephone connections.

The size is 16 ft. x 8 ft. Approximate weights are 17 cwt. empty and 1 ton fully equipped.

Further details may be obtained from Portasilo Limited, Blue Bridge Lane, York.

CONTAINERS

The Kabi range of containers has been augmented by almost-indestructible 5-gal. bins (with or without polythene-covered steel handle) and 10-gal. bin, polythene storage trays, boxes, and tanks (including stackable patterns), and a beaker moulded from polypropylene, a material with good tensile strength, surface hardness and a heat-distortion point almost as high as nylon.

Further details can be obtained from the manufacturer, Kabi (Electrical &

Plastics) Limited, Byng Road, Barnet, Hertfordshire.

VERTICAL WELDER

B.O.C. machines have been introduced which are capable of automatically welding plates vertically.

The welding head is mounted on a carriage which travels up a vertical column at a speed controlled by a differential thermo-couple system. The plates are positioned with a gap between their square-cut edges, and water-cooled copper shoes are clamped inside and outside, to form a mould with the plate edges, for the molten weld metal and slag.

To start the operation an arc is struck at the bottom of the gap in a special copper starting trough containing powder flux to blanket the weld pool. As soon as the powder melts the arc is extinguished. Heat for welding is provided by the passage of current from the welding wire through the molten slag.

Weld metal comes from the special wire melting in the slag which also melts the edges of the plate.

The process cuts out plate preparation and is said to use less wire, flux, and current.

Further details may be obtained from the British Oxygen Co. Ltd., Bridgewater House, St. James's, London, S.W.1.

ELAPSED-TIME METER

A new elapsed-time meter for recording the time a piece of equipment has been in use is being produced by English Electric Co. Ltd. It can be applied to any equipment used intermittently and on which planned maintenance or a time log is required.

The meter is normally connected so that it is automatically switched on and off with the apparatus being metered. It can register up to 9999.9 hours, in steps of 0.1 hour.

The cyclometer register is driven by a self-starting, non-reversing, synchronous motor, through a train of gears. Operation is on a.c. supply in the voltage ranges 100-125, 200-250, and 400-440. The frequency can be 50 or 60 cycles.

The meter is available in two case types. The first is a 4 in. square, flush mounting, switchboard pattern case. The motor is mounted internally.

The second is a 2½ in. or 3½ in. square moulded black plastic case designed primarily for panel mounting. The motor is mounted externally and connection to the

current supply is made through a pair of flexible leads.

Further details may be obtained from the manufacturer, English Electric House, Strand, London, W.C.2.

INSULATION TESTER

The Taylor Model 130C insulation tester covers a very wide range of resistance readings and enables tests to be made on all types of components including resistors, condensers, switches, transformers, motors, elements, domestic appliances, general wiring, circuits, and continuity.

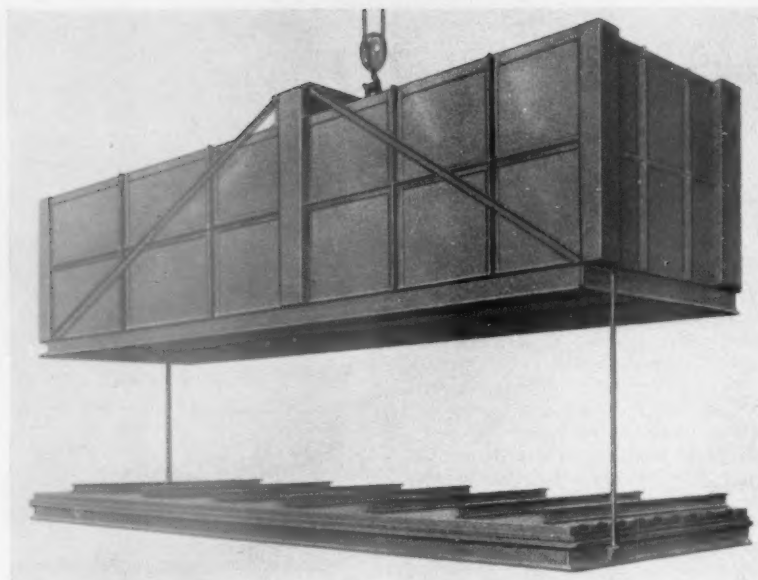
Total resistance measurements covered are from 20 ohms to 1,000 megohms. For insulation measurements, a test voltage of 500V. d.c. at infinity is applied to the component under test via a safety pushbutton switch.

Measurements are made on an easily-legible 5-in. scale. Meter movement is of centre-pole design with a sensitivity of 37.5 µA. Movement is robust and has sprung jewels to withstand rough handling. The centre-pole meter is magnetically shielded—an important feature when using the instrument in the proximity of r.f. fields. It is light and portable, and a leather carrying case can be supplied.

The instrument is designed to operate from a.c. mains between 110V. and 240V. on 40 to 60 cycles. The primary of the mains transformer is fused and the mains adjustment panel and fuse holder are readily accessible.

Further details can be obtained from the manufacturer, Taylor Electrical Instruments Limited, Montrose Avenue, Slough, Buckinghamshire.





BELL-TYPE FURNACE

A lightweight bell-type furnace embodying a low thermal mass form of construction, has been produced to give a pre-determined heating and cooling cycle.

Although suitable for annealing and normalising it is primarily intended for the stress relieving of heavy charges.

The heating-bell casing is a fabricated mild-steel structure, incorporating a main carrying frame of rolled-steel sections with a single-point lifting eye. The casing is lined with low-thermal-mass insulation, embodying semi-refractory element support bricks. Nickel-chromium heating elements are set in the sidewalls and roof of the chamber.

Stress relieving normally involves heating to a temperature within the range 600-650 deg. C., holding at this temperature for a period dependent upon the maximum metal thickness and finally cooling down to 300 deg. C. at a pre-determined rate. Permissible temperature variation throughout the charge being treated is up to 150 deg. C. during heating and up to 50 deg. C. when at the holding temperature. All temperatures are continuously and automatically recorded.

Further details may be obtained from G. W. B. Furnaces Limited, Dibdale Works, Dudley, Worcestershire.

DOMES LIGHTS

A new version of the Unilux fluted dome light with a spheroidal dome is



available in four basic types, all made from glass-fibre reinforced-polyester resin. Plain domes with a flat flange for setting direct on a flat roof with the felt dressed up over the flange, or without the flange for fixing over an upstanding kerb, are made in five standard sizes from 2 ft. 6 in. to 5 ft. square. Other sizes can be made to special order. Two other versions have an upstanding kerb flanged at the bottom, one kerb being plain, the other with ventilating louvres. Both these types are made 2-, 3- or 4-ft. square inside the kerbs. Metal kerbs with adjustable ventilation are also available.

All the domes are made in a range of colours and in standard or fire-retardant material.

Further details can be obtained from the manufacturer, U.A.M. Plastics Limited, Tolpits, Watford, Hertfordshire.

EXCESS-PRESSURE PROTECTION

A new excess-pressure protection valve for steam lines has been introduced by Sir W. H. Bailey & Co. Ltd.

The device includes a double-beat valve attached to a piston across which a pressure differential will be produced by any marked increase in inlet pressure. The effect of the differential is to lift the piston which brings the main valve closer to its seating faces, so that the downstream line is automatically protected from excess pressure. As soon as the supply pressure returns to normal, the valve automatically resumes its original position.

The incorporated relief valve, which is set to lift at a required safety pressure, will deal with any minor pressure rise, but a severe one will tend to close the main valve automatically, but still maintain a downstream supply at the pre-set reduced pressure.

A feature is a needle-valve adjustment, the setting of which allows the performance characteristics to be matched to a specific application. The relief valve incorporates means for easing it. The fitting is said to give the minimum amount of blow-off.

This device is available in bronze, with screwed ends to fit pipe sizes of $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$ and 2 in. It can be fitted into a line with a normal working steam pressure of 150 lb. sq. in., but in an emergency an inlet pressure of up to 300 lb. sq. in. can be accepted.

Further details may be obtained from the manufacturer, Albion Works, Patricroft, Manchester.

FLEXIBLE CABLE

A flexible glass-fibre-insulated cable has been introduced for light-fitting connections. This cable, which is suitable for 250-V. operation, is designed to function at the high temperatures likely to be encountered in contemporary lighting fixtures.

In its natural state, the glass fibre used for the insulation—treated with a suitable form of varnish binder and filler—will not burn or carry flame. Should the cable be subjected to an external source of heat, with temperatures of up to 180 deg. C., the insulation and conductor remain intact, permitting a continued flow of electricity.

Further details can be obtained from British Insulated Callender's Cables Limited, 21, Bloomsbury Street, London, W.C.1.

PROTECTED BANDSAWS

All joined Aven bandsaws from $\frac{1}{2}$ -in. wide are now supplied with a tough yellow plastic strip covering the entire toothed edge. The strip prevents injury when the bandsaw is uncoiled, protects the saw teeth from damage through metal-to-metal contact, and simplifies packing. It fits closely over the teeth, but is easily stripped off.

Further details can be obtained from the manufacturer, Hack Saws Limited, Aven Works, Maltby, Rotherham, Yorkshire.



Ministry of Transport Accident Report

Accident at North Belton occupation level crossing, British Railways, Scottish Region, on December 2, 1960

Colonel J. R. H. Robertson, Inspecting Officer of Railways, Ministry of Transport, inquired into the accident that occurred at about 2.50 a.m. on December 2, 1960, involving a private saloon motor car and two freight trains. The car was driven at about 15-20 m.p.h. from the Up side of the crossing into the side of the engine and tender of a Down steam-hauled Class "C" freight train, travelling at about 45 m.p.h. The car was dragged forward by this train for 50 yds., and then flung, still upright but facing in the down direction, into the path of the Up freight train, also Class "C," which wrecked it. The Up train was diesel-hauled and travelling at about 50 m.p.h. The four passengers in the car were killed, and its driver was badly injured. There was no serious damage to either train.

It was a clear, bright, moonlit night. The occupation track leads from the main A.1 road over the crossing to North Belton Farm. It is a private road with no evidence of public footpath rights. It is about 180 yd. long, from the main road to the crossing, and the railway is in full view—looking towards his right, a motorist should see an Up train continuously during the last half-mile or more of its approach to the crossing. Looking to his left, he should first see the headlights of an approaching Class "C" train when its engine was 250 yd. from the crossing, but the upper silhouette of a steam train and, at night, the glow from its firebox should have become visible to him some 150 yd. back.

Adequate warning notices

The crossing is conventional, with hand-worked 13 ft. field-type gates opening away from the railway. The gates are not hung so as to swing shut across the road when free but can hang open; they open back to clapper posts to which they can be latched. There are warning notices on both sides of the crossing. They are not of standard pattern, but the lettering—"Warning—Level Crossing—Stop—Look—Listen" is quite clear. There are no whistle boards.

Evidence from the driver and fireman of the Down train showed that they did not see the car until the last moment. The fireman saw the headlights of a car approaching from the right and converging with the train. The driver said that the first thing that he knew was that something struck the off side of the cab a heavy blow below frame level. He heard his fireman shout that they had hit a car, and then saw the headlights of the diesel train approaching on the Up line. He gave a series of short blasts on his whistle and brought his train to a stand normally,

with its brakevan 50-60 yd. beyond the crossing. Being trained in first aid, he went back to see what help he could give. He did not regard the level crossing as a dangerous one. The gates were usually shut when he passed them.

The driver and fireman of the Up train saw or heard nothing unusual until when passing the Down train's engine they heard a single sharp whistle and then, two or three seconds later felt two heavy bumps and heard a bang. The driver at once made a full brake application. They did not see a car approaching from the left. Had they done so, they would have sounded the horn. Nor did they see anything of the first collision.

Police witnesses

Two policemen were carrying out a special road check on the main road A.1 at the time. They had stopped the car, the occupants of which were on their way from a dance at Dunbar to take coffee with the owner of North Belton Farm, in the ordinary course of their check. The driver wound his window down at the time, and they thought he had left it open. They watched the car going up the track with its headlights on, and saw from the headlights that the crossing gate was open. They both saw the Down train approaching from the left, and saw the Up train approaching immediately afterwards. They felt alarmed lest the car should not stop, and agreed that it drove on to the crossing without varying its speed. It did so at the same time as the Down train reached the crossing. There was a flurry of sparks and the lights went out, and then, in a matter of seconds, there was a second flurry of sparks some 40-50 yd. to the right of the crossing and the Up train passed. One constable had a vivid recollection of a silhouette of the car, standing sideways to him with its bonnet to the right, just before the Up train struck it.

The driver of the car was suffering from retrograde amnesia when Colonel Robertson visited him in hospital. The last thing he remembered was driving towards the crossing and seeing that the gates were open. He was fairly sure that his driving window was open and the other windows shut; he thought it likely that the other windows had become misted over inside. The car's inside lights were certainly off. He disliked all open level crossings and was cautious at them. He particularly disliked this one, and avoided it if he could.

Gates left open

The owner of North Belton Farm said that the gates were normally kept shut but that he had left them open deliberately as a gesture of hospitality towards, and to help, his expected guests. They all knew where the crossing was and were acquainted with it.

The evidence suggested that when the car was half-way up the track from the main road, the Down train on its left was some 300 yd. and the Up train on its right some 1,000 yd. from the crossing. The Down train thus probably came into view a little earlier than

the Up train, but the latter, with its two electric headlamps, was probably more conspicuous besides being on the car driver's side.

Inspecting Officer's conclusions

Colonel Robertson said that this tragic accident can only be attributed to the car driver's lack of care and failure to keep a proper lookout. The most likely explanation is that he saw the Up train approaching from his right and kept it under observation to the exclusion of everything else. As he got close to the crossing he must have decided that he could safely cross ahead of the Up train, and drove across the Up line, with his eyes on the Up train, into the side of the Down train. He may have glanced to the left and seen nothing through a misted left window, or he may not have glanced at all. Colonel Robertson is sure that he never saw the Down train until too late. Neither of the train crews was in any way to blame.

This crossing is not a dangerous one, although the rail traffic using it is fast. Because of the good views up and down the lines from the gates, only ordinary care is needed. Safety at these unguarded level crossings depends entirely upon the precautions taken by the road users.

Colonel Robertson pointed out that it is always dangerous as well as unlawful to leave the gates of occupation level crossings open, but in this case they had not been left open through inattention or idleness but deliberately, by the occupier of the crossing, to help his expected guests, all of whom were acquainted with the crossing. Their being left open created the coincidence in time and space that made the accident possible and it may have encouraged the driver of the car to think that he could cross safely ahead of the Up train, but it was not responsible for concentrating his attention on that train to the exclusion of the other. Had he obeyed the clear instructions to stop, look, and listen, this accident would not have happened.

Modernisation of Bradford Motive Power Depot

The modernisation of Bradford, Hammerton Street, Motive Power Depot on the North Eastern Region of British Railways is now virtually complete. It was once a steam locomotive shed, now it is a fully-equipped up-to-date depot for servicing and maintaining diesel rail cars and diesel shunting locomotives. There are at present 85 diesel cars maintained at Hammerton Street, a further 60 is to be delivered later. In addition, 19 diesel shunting locomotives are maintained there.

Hammerton Street was, in 1954, the first motive power depot on British Railways to receive diesel multiple-unit trains when the first units were introduced as a pilot scheme on the Bradford-Leeds-Harrogate route. Since that time a continuous scheme of modernisation has been undertaken at the depot to pro-

vide for the stage-by-stage extension of diesel car operations and all steam locomotives have been withdrawn.

Because of its interior layout, and its proximity to Bradford Exchange Station, the depot was particularly suited for conversion to diesel maintenance. The track layout inside the shed required little modification and the special facilities required for servicing and maintaining diesels could be provided with the minimum of alteration and new construction. Facilities for heavy maintenance and interior cleaning of coaches have been provided within the main shed and a new servicing shed, fuelling siding and stabling sidings are the only external additions that have been necessary. The offices, stores and staff amenities have been extensively modernised.

Three of the 11 sidings within the main shed have been partitioned off to provide a repair shop for heavy maintenance. The remaining sidings within the shed have been equipped for cleaning the interiors of the coaches.

Lifting shop converted

The former lifting shop, once used for heavy repairs of steam locomotives has been converted for maintenance of diesel shunting locomotives, and can also accommodate diesel rail car repair work.

Offices, stores and staff amenities form an annexe along one side of the main shed, a new roof has been provided and the ceiling and the interior has been completely remodelled. Offices have been built for the shedmaster, Running Foreman and the clerical staff, and there is a modern fully-equipped staff messroom.

The servicing shed is 80 ft. in length and has been erected over a track with a 190-ft. long pit which was already in existence. The building is open at both ends to enable diesel railcars to progress through it for regular routine inspections, minor adjustments and repairs. Fluorescent strip lighting mounted on the walls is directed from each side at the motors on the power cars. Storage for lubricating oil and anti-freeze is provided by two 750-gal. tanks installed in an annexe, from which they are dispensed to the diesel units in the servicing shed by mobile containers.

Fuelling siding

The fuelling siding, to which the diesel cars run after leaving the servicing shed, is equipped with five fuel-oil dispensing points, each having a 20 gal. a minute fuel pump, protected by weather canopies. There are also ten watering points alongside the siding for refilling overhead lavatory tanks and engine cooling systems and there is concrete runaway troughing and drainage between the tracks to facilitate the cleaning of the car toilets. Six fuel-oil tanks provide a total storage capacity of 38,000 gal.

A carriage washing machine, operated by pushbutton control, consists of a pre-wetting water spray, two pairs of revolving nylon brushes on to which is sprayed a detergent solution and a final rinse water spray. The brushes rotate at high speed and are pressed against the carriage sides by hydraulic arms, giving a strong positive scrubbing action as the trains pass through. The sprays and brushes are situated on either side of a line adjacent to the servicing shed and so arranged that all units leaving the fuelling bay are washed before passing out.

The work has been carried out by Mr. E. L. Triffitt, Chief Civil Engineer, and Mr. M. G. Burrows, Chief Mechanical & Electrical Engineer, British Railways, North Eastern Region.

Uruguayan railway President's visit

The United Kingdom Railway Advisory Service entertained the President of the Uruguayan State Railways, Senor Eng. Don Raul A. Penades, and his Delegation, to dinner on July 20 at the Charing Cross Hotel. The guests included Senor Victor Di Angeli, Senor P. H. Bernier, and Senor Enrique Campal, Uruguayan State Railways, H.E. Senor Dr. Don R. E. MacEachen, Ambassador for Uruguay, Senor Don Guy P. Nery, Uruguayan Embassy.

British Transport Commission

Messrs. J. Ratter, R. C. Bond, J. F. Harrison.

Ministry Officials

Sir James Dunnett, Messrs. H. B. McKenzie Johnston, S. Golt.

Industry

Messrs. R. W. Todd, J. M. Whitaker, L. Short, H. J. H. Nethersole, W. L. Topham, G. J. Corson, H. Andrew, M. A. Crane, G. R. Curry, T. H. Rosbotham, G. A. Ashton, E. J. Wilson, J. E. Owston, C. R. H. Crosland, F. D. Castle, F. A. Manley, H. A. A. White, B. C. J. Waters, D. Martin, Brigadier A. E. M. Walter, and Mr. S. J. Bennett, Secretary, U.K.R.A.S.

Modernised lifts at Lancaster Gate

The two lifts at Lancaster Gate Station on the London Transport Executive's Central Line, have been modernised. One of the lifts is illustrated below. The electrical



Modernised lift at Lancaster Gate

and mechanical equipment has been replaced and the interior of the lift cars has been brought up to modern standards with laminated plastic panelling and fluorescent lighting.

These lifts, with two at Holland Park, are the last of the original lifts installed

when the first section of the former Central London Railway was opened in 1900. As traffic has grown, all the other lifts of this type have been replaced by escalators or automatic high-speed lifts, but the amount of the traffic at Lancaster Gate is such that it can still be handled by the original lifts now that they have been modernised.

The original winding machinery has been replaced by new gear manufactured by Clarke, Chapman & Co. Ltd., and electric controllers made by the Watford Electric & Manufacturing Co. Ltd., have been fitted. The operation of the safety gear has been made uniform with that on London Transport's other lifts. Slowing and stopping of the lift is controlled by switches mounted in the lift shaft and actuated by ramps on the car. Nylon has been used for the bushes of the pivots of the levers in the door-operating mechanism.

The cars have been panelled in light blue weave-pattern Waverite. Advertisement frames have been fitted, and fluorescent lighting has been used with special masks fitted to the tube holders to reduce reflections.

The work has been carried out under the supervision of Mr. E. P. Lumley, Mechanical Engineer (Lifts & Escalators), to the requirements of Mr. A. W. Manser, Chief Mechanical Engineer (Railways) London Transport.

Demonstration run of English Electric "Deltic"

Commencing on September 11, when the winter timetable comes into operation, journey times between Kings Cross and the North will be cut by between 40 and 60 min. These accelerated timings have been made possible by the use of the English Electric 3,300-h.p. "Deltic" locomotives.

The allocation of the 22 units on order is as follows:—Eastern Region: eight, North Eastern Region: six, and Scottish Region: eight. Three locomotives have been delivered to each of these regions and last week the Eastern Region gave a demonstration run for representatives of the press and railway executives between Kings Cross and Leeds, with point-to-point timings equivalent to those which will be effective for the West Riding winter service.

With an average speed of 72 m.p.h., start-to-stop, from Hitchin to Retford, this will be the fastest train on British Railways. For the demonstration run locomotive No. D.9003 was used, hauling 11 coaches having a total weight of 386½ tons. All Eastern Region "Deltics" will be named after famous racehorses, this locomotive carrying the name of *Meld*.

Leaving Kings Cross at 9.24 a.m., the train reached Peterborough North at 10.35 a.m., maximum speed being 92 m.p.h. between Hitchin and St. Neots. The schedule included a 5-min. stop at Peterborough to allow the "Pacific"-hailed 9.0 a.m. Kings Cross to Leeds to keep ahead as far as Doncaster. At Warrington Junction the speed was 90 m.p.h., and the summit of Stoke bank, 1-in-178, was cleared at 85 m.p.h.

All permanent way restrictions were observed and Leeds Central reached at 12.31 p.m., 3 min. ahead of the scheduled timing. Train acceleration was noticeably smooth and rapid, with a low noise level in the coach adjacent to the locomotive.



English Electric 3,300 h.p. "Deltic" locomotive type 5 at Kings Cross

Leaving Leeds Central at 2.06 p.m., the return run was made in accordance with the schedule, stopping 6½ min. at Peterborough North and arriving at Kings Cross at 5.10 p.m. Spot checks on the speed showed Wakefield, 75 m.p.h.; Doncaster, 84; Essendine, 93; Hitchin, 93; and Knebworth, 73.

Examples of the accelerated timings for the "Deltics" show a cut of 47 min. on "The Yorkshire Pullman"—Kings Cross to Harrogate and Hull; 44 min. on "The West Riding"—Kings Cross to Leeds and Bradford; 43 min. on "The Aberdonian"; and 59 min., Newcastle to Kings Cross. The new service from Kings Cross to Sheffield will take 2 hr. 50 min. Steam-hauled timings will continue to operate during the changeover period until September. Routine maintenance of the Eastern Region "Deltics" will be carried out at Finsbury Park.

Mineral line in Gabon

The French mining concern, Compagnie Minière de l'Ogooué (generally known as Comilog), is developing manganese deposits near Franceville in the Republic of Gabon in Central Africa, formerly part of French equatorial Africa. To carry the ore extracted the company is constructing a 60-mile cableway from the mining area to M'Binda with a carrying capacity of 850,000 tons a year. From M'Binda, near the Gabon-Congo border, the company will also build an 180-mile 3-ft. 6-in. gauge railway to link up with the Congo-Ocean Railway at a point about 120 miles from the port of Pointe-Noire. The ore wagons will run through from M'Binda to Pointe-Noire, some 300 miles.

To provide power in the first instance for the construction of the line and later for hauling the ore trains when the railway is complete, the company has placed a £535,000 order with the General Electric Company, Schenectady, U.S.A. for seven 1,420-h.p. diesel-electric locomotives. The first three engines were shipped last year and the other four are now on their way to Gabon. Completion of delivery was contracted for September, but to meet the needs of Comilog, production was expedited to make the earlier delivery possible. The first three engines

have been at work on the construction. When the line is open for traffic the diesels will work in two and three units to haul 2,500-ton train loads. Climatic conditions are severe with consistent temperatures of 95 deg. F. and nearly 100 per cent humidity, the average rainfall being 85 in.

Eastern Region and Batchelors Foods Limited

The headquarters and main factory of Batchelors Foods Limited are at Wadsley Bridge, Sheffield, from where it despatches by rail between 70,000 and 80,000 tons of canned vegetables and fruit each year.

The raw materials for the factory consist mainly of vegetables or fruit from many localities, including imports collected from the main docks, cans from metal-box factories, and coal from local collieries. The fresh vegetables and fruit are conveyed mainly by

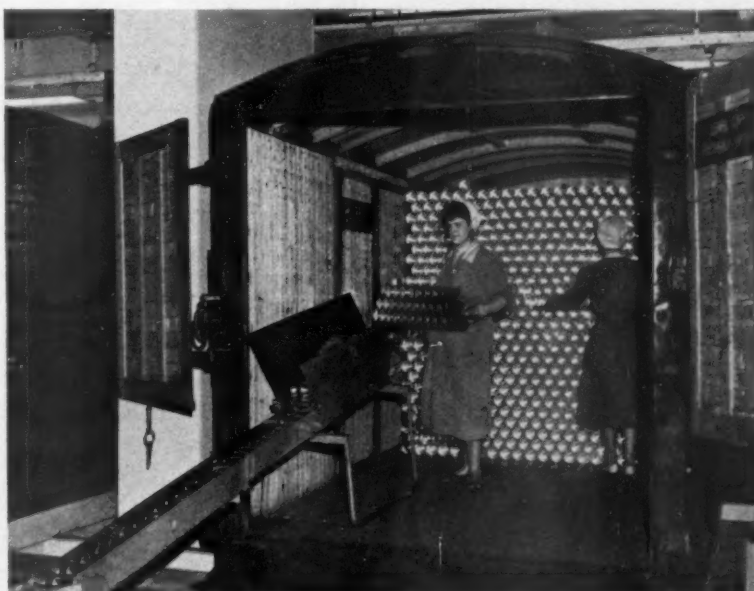
road, but the dried peas and all the cans are delivered by rail. Between 250 and 300 million cans are received annually at the Sheffield factory, and they arrive at the factory private sidings packed in bulk B and BD containers at the rate of about 30 to 40 a day. Two hundred of these containers are in circuit working between Wadsley Bridge and Sutton-in-Ashfield, the nearest metal-box factory. These containers hold about 30,000 cans stacked in layers.

Each container is located by the company's own diesel shunter under a gantry crane which lifts the container on to a special stand about 4 ft. above ground level. A special Brush electric lift truck is driven under the container, which is lifted by hydraulic power clear of the stand, and taken to the unloading dock where it is deposited on to another similar stand. There is room in the loading bay for 18 containers. When the containers are in position the doors are opened and two girls work on each container transferring the cans to fast conveyor belts, as in the illustration. A bar of wood with two handles and a row of a dozen wooden spikes, is used to handle the cans. By inserting the spikes into a dozen cans a whole pyramid is lifted in one operation and it takes only 40-60 min. to empty a container load. As soon as the containers are empty they are returned to the metal-box factory for reloading.

The full cartons of finished products ready for despatch are loaded on to pallets and driven by pallet truck to the rail loading bay. About 50 Palvans are forwarded by express freight trains each day to different destinations.

In addition to the bulk forwardings in Palvans, the company send large quantities of traffic in small consignments to Woolworth's branches throughout the country. These products are stored in bulk at the British Railways, Eastern Region, warehouse at Sheffield Wicker Station. The individual cartons are labelled and despatched from this warehouse by railway staff.

A further joint effort between Batchelors



Staff of Batchelors Foods unloading a container

and British Railways is the working of a fully mechanical coal handling plant. This receives deliveries direct by rail in 21-ton hopper wagons. In the first five months of 1961, some 3,400 tons were delivered, and this tonnage is increasing.

Questions in Parliament

Earnings of British Railways Officers and staff

Mr. Stephen Swinger (Newcastle-under-Lyme—Lab.) asked the Minister of Transport on July 19 if he was aware that since 1952 the British Transport Commission, unlike other nationalised industries, has not included in its annual reports figures of the totals of wages and salaries paid by the Commission as a whole or British Railways in particular; and if he would give a direction to the Commission to include the figures in its future reports and to publish the totals for each year since 1952. In a written answer, Mr. Marples stated that the Commission regularly published detailed information about the numbers and earnings of staff employed on British Railways.

Staff & Labour Matters

Shorter working week for railway salaried staff

The Railway Staff National Tribunal has given its award in connection with the claim of the T.S.S.A. for a 38-hr. week for all salaried staff on British Railways, and a copy of the award is reproduced below:—

"The Tribunal, having given careful consideration to the evidence and submissions of the parties, finds that the claim as set out in the terms of reference has not been established. It has, however, noted with satisfaction that the Commission is prepared to give favourable consideration, on the basis referred to in paragraph 4, to the reduction of the standard weekly hours of duty of salaried staff to 40 per week; and it expresses the hope that with goodwill and co-operative discussions on both sides this reduction will not be long delayed. The Tribunal has noted the wide variety of working hours of various categories of salaried staff, and particularly among clerical staff, and recommends that after the conclusion of the discussions referred to above the parties should discuss the possibility of eliminating inequalities of rostered hours between categories of workers whose duties are broadly speaking the same."

Paragraph 4 relates to the Commission's offer that a joint working party should examine the manner in which a reduced working week could be implemented so as to ensure its efficient and economic application.

ASTLEY BRIDGE CLOSES DOWN

The London Midland Region of British Railways is to close Astley Bridge Goods Depot, near Bolton, for all traffic on September 4.

WAREHOUSE AT PRESTON DOCKS

Anglo-Continental Container Services (London) Limited has erected a standard-steel dockside warehouse 280 ft. long at Preston Docks to accommodate container traffic passing between the United Kingdom and Ireland.

CONTRACTS AND TENDERS

£1-million marshalling yard at Sheffield

Lehane, MacKenzie & Shand Limited has been awarded a contract worth £1 million for the construction of a marshalling yard at Tinsley, Sheffield. The work involves the excavation of 4,500,000 tons of earth. The contract is expected to take 28 months to complete.

S. H. Heywood & Co. Ltd. has received a contract from Richard Thomas & Baldwins Limited worth approximately £53,000 for overhead travelling cranes. The cranes are for installation at the plant of H. F. Spencer & Co. Ltd.

A contract worth £270,956 for the replacement of a railway level-crossing has been awarded to Dowsett Engineering Construction Limited by West Riding County Council, as agent for the Ministry of Transport. The level crossing is at Hopperton in Yorkshire and the contract involves the construction of a dual carriageway road 74 ft. in width.

The Swiss Federal Railways is to order 36 self-driving electric-motor passenger coaches for 43,200,000 Sw. Fr., 10 diesel engines for 11,800,000 Sw. Fr. and 575 trucks and vans for 18,000,000 Sw. Fr.

The New Zealand Railways has placed an order through its Acting Chief Purchasing Officer in London with Plasser Railway Machinery (G.B.) Limited for the supply of one Plassermatic VKR-04 PX-10, levelling, lifting and tamping machine, one Plasser & Theurer VKR-03 fully automatic, all-hydraulic track tamping machine and one Plasser & Theurer HM 300 ST tamping, lifting and levelling machine together with spare parts for each machine.

An order has been placed by Irish Railways (Coras Iompair Eireann) with Plasser Railway Machinery (G.B.) Limited for the supply of one high-capacity levelling, lifting and tamping machine, type Plassermatic VKR-04 PX-10 with accessories.

British Railways, Southern Region, has placed the following contracts:—

The Fairfield Shipbuilding & Engineering Co. Ltd.: steelwork for new staff accommodation, Ashford

Aubrey Watson Limited: strengthening of Bletchingley road bridge

F. W. Hill (Bognor Regis) Limited: new staff accommodation at Fishbourne Halt

Fairey Air Surveys Limited: aerial survey

John Lay & Co. (Portsmouth) Ltd.: new telephone exchange at Portsmouth

Clark Hunt & Co. Ltd.: heating installation to switch and crossing shop, Angerstein Works

Dorman Long (Bridge & Engineering) Limited: reconstruction of Pig Hill Bridge

Leonard Fairclough (London) Limited: reconstruction and widening Cliffe Bridge

Aubrey Watson Limited: reconstruction of Wych Hill Bridge

Stephens & Son Ltd.: new staff accommodation, Exmouth Junction

Alfred Bagnall & Sons Ltd.: station renovations, Waterloo

Pirelli General Cable Works Limited: station alterations, catenary lighting, Victoria

A. Edmonds & Co. Ltd.: modernisation of Continental enquiry office, Victoria

George E. Taylor & Co. (London) Ltd.: ventilation of C. & W. Works, Eastleigh

K. Mikolay & Son Ltd.: renewal of pumping main, Newhaven

C. Predeth (Builders) Limited: station renovations, Dumpton Park.

The Export Services Branch, Board of Trade, has received calls for tenders as follows:—

From Thailand:

One set electric driving apparatus turntable attachment.

The issuing authority is the State Railways of Siam to whom bids should be sent. The closing date is August 28, 1961. The tender No. is 04146. The Board of Trade reference is E.S.B./23432/61.

From India:

6 mobile flash-butt welding plant suitable for welding rails up to and including 59.5 k.g. per metre (120 lb. per yd.) both bull-headed as well as flat-footed.

The issuing authority is the Director, Railway Stores, Railway Board, Rail Bhavan, Raisina Road, New Delhi, to whom bids should be sent. The closing date is September 11, 1961. The tender No. is G.P.-26/61. The Board of Trade reference is E.S.B./23474/61.

From Uruguay:

Lot 1. 23 sets. Points, 3-658 m. (12 ft.). 24 sets. Points, 4-572 m. (15 ft.). 3 sets. Points, 5-486 m. (18 ft.).

Lot 2. 10 nos. Complete Switches ("Cambios"), 1:8 type. 13 nos. As above, 1:10 type. 2 nos. As above, 1:12 type.

The tender No. is 625/61. The closing date is August 23, 1961. The Board of Trade reference is E.S.B./23754/61.

Lot 1. Up to 15 nos. Diesel Rail Coaches

Lot 2. 26 items Miscellaneous Spare Parts and Accessories.

The tender No. is 630/61. The closing date is October 6, 1961. The Board of Trade reference is E.S.B./23755/61. The issuing authority for the above tenders is the Administración de Ferrocarriles del Estado, Montevideo, to whom bids should be sent.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

NOTES AND NEWS



First of 4,000 railvans designated exclusively for the carriage of newsprint on the Canadian Pacific Railway

Merger abandoned. The Institution of Municipal Engineers has decided to take no further action towards amalgamation with the Institution of Civil Engineers.

Bus timetable available. The London Transport Executive has published a comprehensive timetable of its central bus services. The timetable, hitherto for the exclusive use of officials, is now available to the public.

Hilger & Watts Limited acquisition. Hilger & Watts Limited has acquired the whole of the issued share capital of Microwave Instruments Limited. Mr. J. Bilbrough will continue as Managing Director.

C.P.R. newsprint vans. The Canadian Pacific Railway is to reserve 2,850 of its railvans for newsprint traffic and to distinguish them a red shield will be painted to the left of the door. A further, 1,150 vans are being built for this traffic and the illustration above shows the first 22 of these to be delivered. Connecting carriers in the United States and Canada have been asked to co-operate in

returning the 4,000 vans speedily to the originating point.

Increase in fish traffic rates. British Railways is to increase freight charges for the carriage of fish from August 1 by 10 per cent.

London-South Wales motorway. The Minister of Transport has placed a contract with Fitzpatrick & Son (Contractors) Ltd. for initial work on the Chiswick-Langley section of the London to South Wales motorway. The value of the contract amounts to £459,100.

U.S. railway altercation. According to Comtelburo, an official in the United States Department of Justice has recommended to the Interstate Commerce Commission that the Chesapeake & Ohio and the New York Central Railways should be denied authority to acquire control of the Baltimore & Ohio Railroad. The lines have been competing for B. & O. control in hearings before the commission during the past four weeks and the Justice Department official contended that

both pleas should be denied on the ground that each had been attempting to buy B. & O. control before commission approval.

Inquiry into Weeton accident. On July 25 at Manchester Victoria Station, Brigadier C. A. Langley, Chief Inspecting Officer of Railways, Ministry of Transport, held an inquiry into the accident at Weeton on July 16.

Cheap tickets to Hull show. The North Eastern Region of British Railways is to issue first and second class cheap day return tickets to Hull from all stations within a radius of 75 miles on August 4 and 5, when the first Hull Show will be held.

Appeal by railway society. The Chairman of the Welshpool-Llanfair Railway Preservation Society, Lt.-Colonel Sir Thomas Salt, appealed to the Society's 350 members for a donation of £15 each to help the society out of money difficulties. The line was closed by British Railways in 1958.

Change of address. The production and key personnel of Materials Handling Equipment (Great Britain) Limited, will be transferred to the works of the Hunslet Engine Co. Ltd., Jack Lane, Leeds, from August 14. The London and Maidenhead offices will be at Locomotive House, 30-34 Buckingham Gate, S.W.1, telephone No. Sullivan 2875-8.

Dr. Beeching's visit to The Grove. Dr. Richard Beeching, Chairman of the British Transport Commission, visited the Commission's Work Study Training Centre at The Grove, Watford, on July 17. In the illustration below are, left to right, front row: Mr. P. Corbishley, Senior Instructor; Mr. J. Jennison, Assistant, Productivity & Work Study, Motive Power Department, London Midland Region; Mr. E. J. Larkin, Director of Work Study, B.T.C.; Mr. A. G. Kentridge, Principal, Work Study Centre, Watford; Dr. Beeching; Mr. J. T. W. Nelson, Work Study Assistant, Hotels; Mr. W. J. Jeffries, Work Study Officer, Office of General Manager, Paddington, Western Region, and Mr. R. H. Brown, Instructor, Work Study Centre, Watford.



Dr. Richard Beeching with officers and staff at the British Transport Commission work study training centre at Watford

London Transport "Bus-About" tickets. The London Transport Executive is to issue "Bus-About" tickets during August, giving schoolchildren unlimited travel on central bus routes numbers 1-299 for one day. The price will be 2s. 6d. for children under 14 years old and 5s. for others.

Timetables exhibited at Royal Show. The Eastern Region of British Railways exhibited train information on two poster fitments resembling lichgates at the recent Cambridge Royal Show. The fitments,



Lichgate poster stand at the Royal Show, Cambridge

one of which is illustrated above, were used instead of the British Railways information kiosk which had proved impracticable in inclement weather in previous years.

R.H.A. West Cornwall sub-area. The West Cornwall and the Penzance sub-areas of the Road Haulage Association have been amalgamated and will be known as the West Cornwall sub-area. Mr. W. J. Duckham has been appointed Sub-Area Chairman and Mr. J. Hitchens, Sub-Area Vice-Chairman.

Henry Sykes Limited depot at Sandbach. Henry Sykes Limited has opened a depot in Cheshire. The address is Studd Green Works, Elworth, Sandbach, Cheshire. Telephone Sandbach 986.

Ergonomics in industry. H.M. Stationery Office has published the proceedings of the Conference on Ergonomics in Industry on September 27-29, 1960, for the Department of Scientific Research. The price is 12s. 6d. or, by post, 13s. 4d.

John Thompson Limited centralisation. The John Thompson Limited engineering group has centralised its London sales organisation in a building which forms an east wing to Tavistock House, Tavistock Square, London.

Special trains for exchange visit. The North Eastern Region of British Railways, in co-operation with the Yorkshire-Lille Exchange Committee, is to run special trains on August 7 and 9 to convey French and English schoolchildren and teachers to Lille. For the children travelling on August 9 there will be a special sailing from Dover to Boulogne to convey them across the Channel.

Egginton goods depot to close. Egginton goods depot, between Derby and Tutbury, on the

London Midland Region of British Railways, is to be closed on August 7 for all traffic except that dealt with at private sidings.

Institute of Welding exhibition. The Institute of Welding is to hold an exhibition concurrently with its Spring meeting at Buxton from April 30 to May 4, 1962.

Plant depot at Scunthorpe. Chamberlain Plant Limited has opened a depot, to serve the north eastern area of the United Kingdom, at Scunthorpe.

"On Railways." The British Broadcasting Corporation's programme "On Railways" on August 3 will be recordings and observations on French railways by Mr. P. Ransome-Wallis.

London Midland Region news sheet. The London Midland Region of British Railways has inaugurated a monthly staff newspaper called "Ahead," for distribution to staff concerned with electrification. The first four-page edition was distributed earlier this month.

Railway Stock Market

Among foreign rails, Antofagasta continued their improvement, the ordinary stock being 19½, their best so far this year, which compared with 18½ a week ago. The preference stock gained half a point at 34½, while the 4 per cent perpetual debentures were 39½. Moreover, United of Havana second income stock strengthened from 6½ to 6¾; the consolidated stock was quoted at 1½, and business was recorded at 1½. Elsewhere, San Paulo Railway 3s. units have firmed up from 2s. 1½d. to 2s. 3d. Mexican Central "A" bearer debentures held steady at 59.

Costa Rica ordinary stock lost a point at 40½; the 6½ per cent first debentures were again 95½. In other directions, Brazil Railway bonds remained at 3½. Chilean Northern 5 per cent first debentures were 50, and Paraguay Central prior debentures 18½. Salvador Railway consolidated stock changed hands at 1½.

International of Central America shares were again quoted at \$19½ with the preferred stock \$103½.

Canadian Pacific rallied from \$43½ a week ago to \$44½, at which there was a yield of nearly 6 per cent. The preference stock was maintained on balance at 54 at which the yield was over 7½ per cent, while the 4 per cent debentures at 53½ gave an attractive yield of 7½ per cent. White Pass shares remained at \$11½. Calgary & Edmonton Railway 4 per cent debentures changed hands at 51 and Ontario & Quebec 5 per cent permanent debentures showed business around 64½.

Midland of Western Australia £1 units of second debentures showed business at 11s. 6d. West of India Portuguese capital stock was dealt in at 117. Barsi Light Railway stock was again quoted at 17. Nyasaland Railways shares were 9s. 6d. and the 3½ per cent debentures 32.

Among shares of locomotive building, engineering and kindred companies, Beyer Peacock 5s. shares at 7s. 3d. were maintained on balance, Charles Roberts 5s. shares eased from 6s. 6d. to 6s. 3d. and Birmingham

Wagon reacted on balance from 24s. to 22s. North British Locomotive eased to 6s., which compared with 6s. 3d. a week ago. Elsewhere, Gloucester Wagon 10s. shares, after dipping to 8s. 3d., firmed up to 8s. 9d. and Wagon Repairs 5s. shares, which remained under the influence of the higher dividend, were well maintained at 21s. 6d. Westinghouse Brake, after 34s. 3d. rallied to 34s. 9d. at which there was a yield of nearly 6½ per cent on the basis of last year's 11 per cent dividend. G. D. Peters were 19s. 4½d.

In electricals, G.E.C. were affected by the sharp drop in profits shown by the preliminary figures, which had already been foreshadowed by the directors. The shares, which have come back from 32s. a week ago to 31s. yield over 6½ per cent on the maintained 10 per cent dividend. English Electric were 32s. compared with 30s. 9d. a week ago, and A.E.I. rallied from 36s. 6d. to 38s. 3d. B.I.C.C. gained a few pence at 56s. 9d.

Pressed Steel 5s. shares recovered on balance from 20s. 3d. to 22s. 7½d. and Dowty Group 10s. shares were 34s. 9d. compared with 32s. 10½d. a week ago. Elsewhere, Broom & Wade 5s. shares strengthened to 22s. 7½d. Reflecting the general trend, Vickers rallied on balance from 30s. 3d. to 32s. 9d. British Oxygen 5s. shares, after 20s. 1½d., improved to 20s. 7½d.

Leyland Motors were 94s. 3d. Ransome & Marles 5s. shares firmed up from 14s. 9d. to 15s., but on balance, Pollard Bearing 4s. shares came back from 37s. to 35s. 6d. Steels attracted more attention because of the good yields and the decision of Colvilles to go ahead with the big rights issue.

Forthcoming Meetings

July 29 (Sat.). The Permanent Way Institution, London Section. Visit to Colchester Station reconstruction and Harwich Ferry terminus.

August 26 (Sat.). The Railway Enthusiasts Club, tour of interesting lines in the London area. Open to non-members.

Sept. 2 (Sat.). Permanent Way Institution, London Section. Visit to Southampton Docks.

Sept. 16 (Sat.). The Permanent Way Institution, East Anglia Section, visit to Permal Limited, Gloucester.

Sept. 16 (Sat.). The South Bedfordshire Locomotive Club, special train over the freight-only, Welwyn Garden City to Hertford branch.

Sept. 21 (Thu.). The Model Railway Club, film show, at Keen House, Calshot Street, N.I.

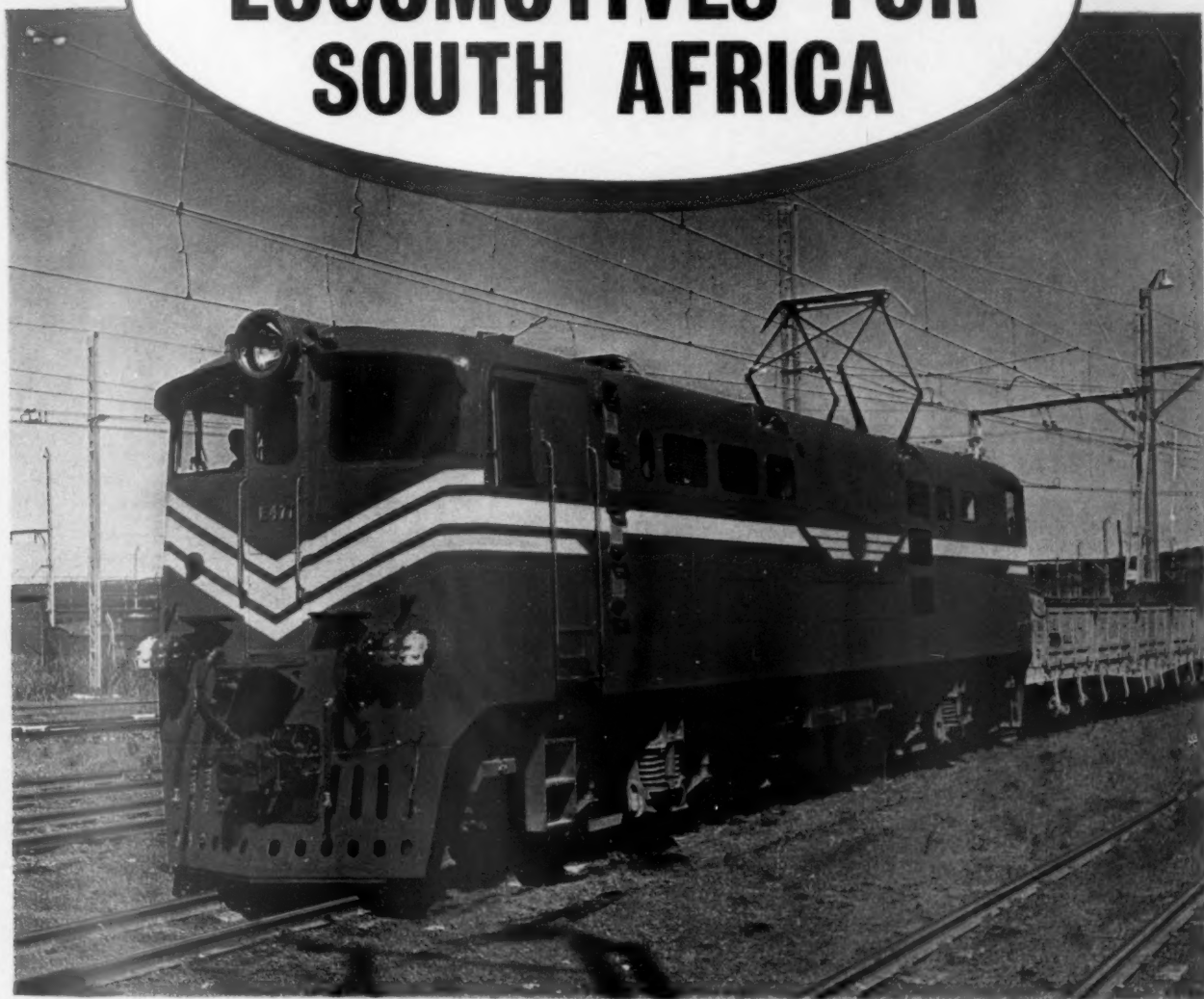
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Applications stating age, qualifications and experience should be sent to the Chief Engineer, Guest Keen Iron & Steel Works (Branch of G.K.N. Steel Co. Ltd.), East Moors, Cardiff.

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*One of the 135 AEI 3000 volt
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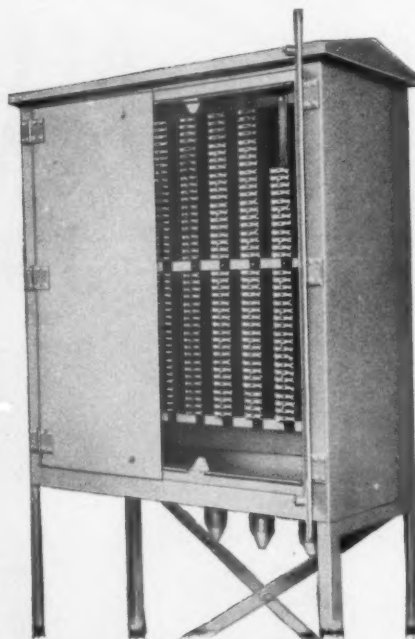
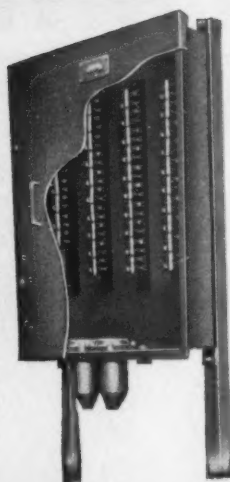
Traction Division

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for
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and
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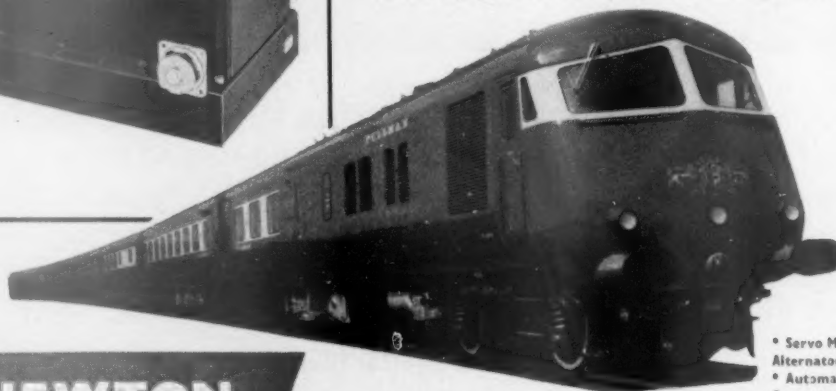
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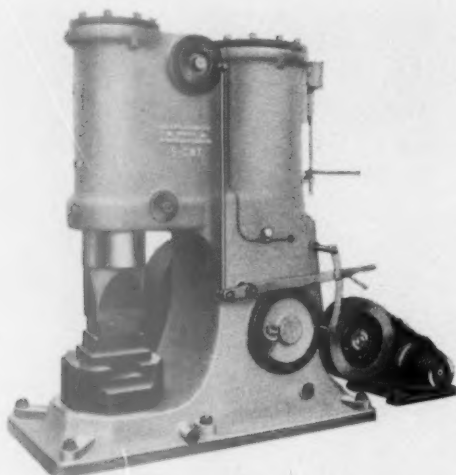
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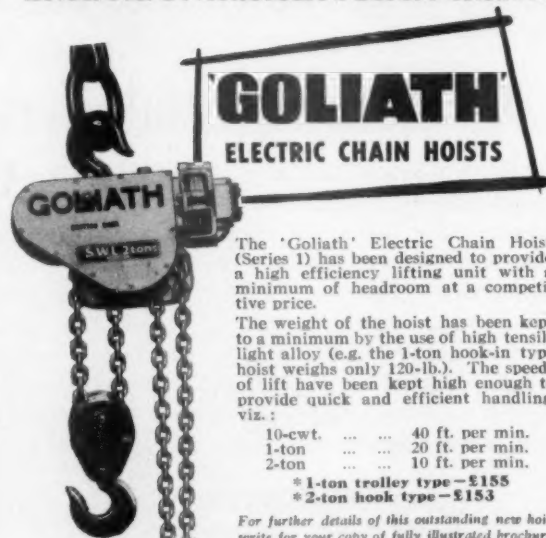
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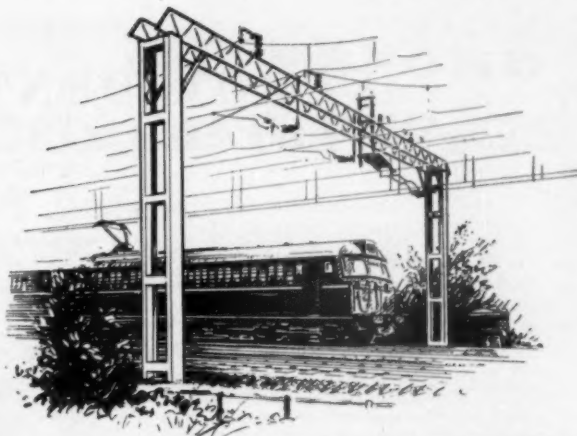
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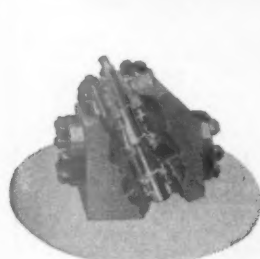
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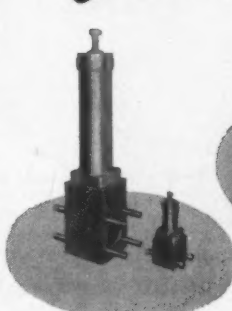


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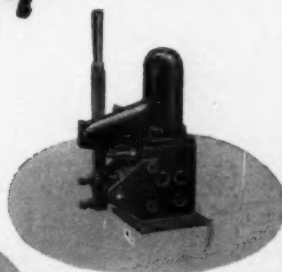
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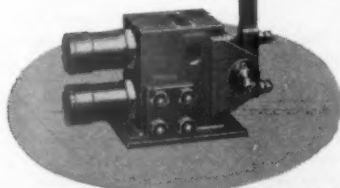
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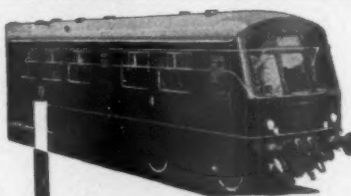
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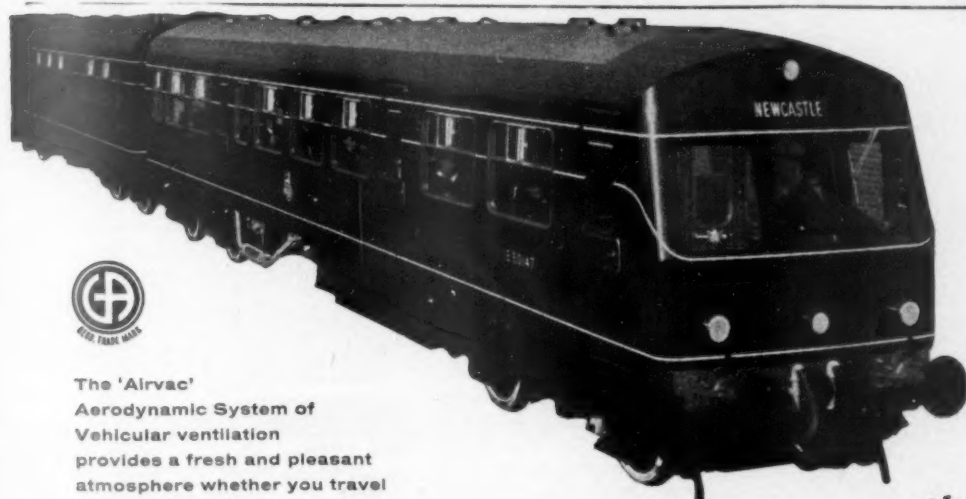
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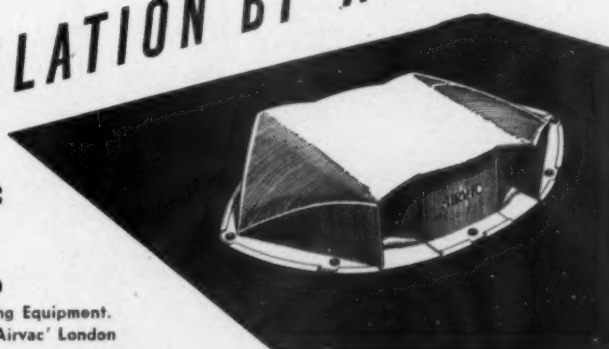
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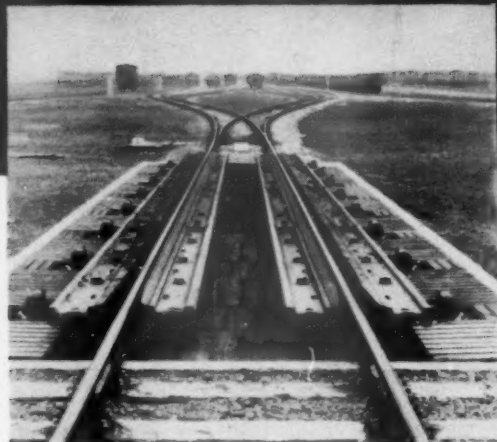
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